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TO OFFICERS AND MEN OF THE COAST ARTILLERY CORPS.

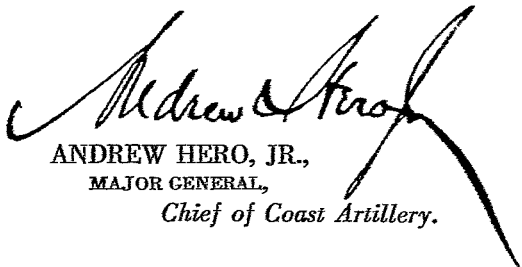
Greeting!

Having been designated "to take charge of the Coast Artillery Corps," I do so with full appreciation of the honor conferred upon me, and a deep sense of the responsibility incident thereto.

All my services since 1891 has been with the artillery manning coast fortifications, now the Coast Artillery Corps. The achievements of the Corps in the past, its record of high efficiency in all its lines of activity, are well known to our older officers, and should prove a strong incentive to younger officers who are making this branch their profession. We all have a high standard to maintain. We must all put forth our best efforts to this end.

It behooves one upon assuming a new office to be careful that the enthusiasm of the moment does not impel one to make promises whose fulfilment may be difficult or to lay down policies which may later be found short-sighted. I shall therefore refrain from projecting myself into the future at this time and limit this message to an assurance to you that you need not expect any abrupt departure from the methods now being followed in solving the major problems which face us.

Through my contacts with many Coast Artillery activities I feel I have accumulated an experience which should be of real value when applied to the various phases of our mutual work. I am sure you know it shall be my constant endeavor to promote the interests of the Coast Artillery Corps through a consistent development program, a reasonable training objective and a fair distribution of personnel.


ANDREW HERO, JR.,
MAJOR GENERAL,
Chief of Coast Artillery.

Antiaircraft Defense

By

BRIGADIER GENERAL C. L'H. RUGGLES*

Ordnance Department

INTRODUCTION

THE most effective defense against enemy aircraft is, of course, the offensive action of our own aircraft. If we could count on absolute command of the air, not only general command of the air, but command at all times day and night and in all places at the front and behind the lines, the need for antiaircraft defense would be greatly decreased. But aviation is a very mobile force, and by skillful maneuvering the enemy aviation, even if inferior in power to our own, may secure a temporary local command of the air: and this doctrine is recognized by aviators who would never admit that they would be absolutely helpless against a superior air force. By its mobility enemy aircraft may at any time, but particularly at night, slip across our front and penetrate far into our territory in spite of the superiority of our own air power. If our air force is inferior to that of the enemy, or becomes so at any time, the need for supplementing it by antiaircraft defenses is obvious.

One of the inherent advantages of an air force is its mobility, and it should be relieved whenever possible from being tied down to the defense of particular installations on the ground—among which may be included our own airdromes. In many instances ground installations to be protected from hostile aircraft will be located so close to the front lines that enemy bombers or attack planes can pass over our lines and reach their target before our own aviation can get from the ground into the air in a fighting formation and climb to a fighting altitude. To insure a continuous, instant defense of such installations at all times, day and night, we must either provide an antiaircraft defense, or keep our own pursuit planes in the air above these installations at all hours during the day and night. Only in the defense of the most critical areas should any part of our air force be immobilized for the defense of ground installations, and the part so immobilized should be held to a minimum.

The continued building up of antiaircraft defenses by all the combatants in the World War is the best testimony that antiaircraft defense is

*Statement before the President's Antiaircraft Board.

a valuable and necessary adjunct to the other combatant arms in time of war. This testimony is confirmed by the thought now being given to anti-aircraft defense by the leading countries of Europe and the efforts they are making to increase the efficiency of anti-aircraft fire by training of anti-aircraft personnel and by improvement in anti-aircraft materiel.

FUNCTIONS

It is believed that the principal functions of anti-aircraft defense are as follows:

- (1) To provide immediate protection to important ground installations against bombing and attack planes.
- (2) To provide immediate protection for bodies of troops, including artillery, against low-flying aircraft.
- (3) To drive off or destroy enemy planes in the absence of friendly aircraft.
- (4) To break up enemy aircraft formations so as to allow defending planes to engage the disordered attack at an advantage.
- (5) To protect friendly aircraft when they are engaged at a disadvantage.
- (6) To indicate enemy aircraft to the defending aircraft.
- (7) To form the sole means of defense when the geographical position of vulnerable points precludes all possibility of adequate warning being given to defending aircraft in time for them to attain their fighting altitude.

WEAPONS

In order to carry out the above functions, the following types of anti-aircraft weapons are now believed to be necessary:

- .30-cal. Machine Guns on Antiaircraft Mounts.
- .50-cal. Machine Guns on Antiaircraft Mounts.
- 37-mm. Full Automatic Guns on Antiaircraft Mounts.
- 3-inch Antiaircraft Guns on Mobile Carriages.
- 3-inch and 4-inch Antiaircraft Guns on Fixed Carriages.
- Searchlights and Listening Devices.

The ranges, both horizontal and vertical, of these various cannon are shown on the chart attached hereto.* This chart shows not only the ranges of the existing materiel, but also those of the materiel which has been built since the World War or is under construction at the present time.

EFFECTIVENESS OF ANTI-AIRCRAFT DEFENSE AS INDICATED BY

WORLD WAR RECORDS

The best measure of the effectiveness of anti-aircraft artillery is undoubtedly found in the records of the World War period, since these records were obtained under actual combat conditions.

*EDITOR'S NOTE: Not reproduced. See COAST ARTILLERY JOURNAL, JANUARY, 1926, p. 24.

No antiaircraft artillery was in existence prior to the World War. During the war this class of artillery had to be rapidly developed to meet the development of aircraft. Not a great deal could be accomplished in this connection during the first period of the war since shortages of other types of artillery also existed. During this period field guns mounted on wooden carriages or improvised structural mounts were used for antiaircraft guns, and the fire-control instruments consisted of paper charts and improvised plotting boards. Notwithstanding the crude antiaircraft guns and instruments which were then available antiaircraft artillery was found to be of great value.

The following table, which is taken from official reports, is believed to be of interest. It gives a comparative statement of the number of airplanes brought down by the Aviation Service on certain fronts and the number of planes brought down by antiaircraft guns on the same fronts.

<i>Nation</i>	<i>Planes brought down by Aviation Service</i>	<i>Planes brought down by A. A. guns</i>
Italy	540	129
Germany	6554	1520
France	2000	500
	9094	2149

Thus the antiaircraft guns accounted for about one-fifth of all the planes which were destroyed by the three countries mentioned. In this connection it should be remembered that destroying enemy aircraft is only one of the functions of antiaircraft artillery, as set forth above, and the official War Department records indicate that antiaircraft defense fulfilled the other missions which were assigned to it quite as effectively. A further search of the War Department records indicates that the following expenditure of ammunition was made per plane destroyed.

Rounds per plane brought down

French records:

1916	11,000
1918	7,500

British records:

1917	8,000
1918	4,550
Last part of 1918	1,300

The American Service is officially credited with 58 enemy planes and an average of 605 shots required to bring down each plane.

The interesting point to be noted in the figures of ammunition expenditures in terms of planes brought down is the very rapid increase in the apparent effectiveness of fire notwithstanding the improvement in the speed

and the ceiling of aircraft during that time. This was undoubtedly due almost entirely to the improvements in antiaircraft guns and fire-control instruments which were being made as rapidly as possible throughout the World War period. It should also be pointed out that the planes officially destroyed cannot be in any way considered as the full measure of effectiveness of this arm of the service. To this must be added a knowledge that solely by its presence antiaircraft defense required the enemy to fly higher than was advantageous for his mission; that frequently enemy planes were turned back by the antiaircraft defenses from attempting their missions; that frequently enemy planes which succeeded in returning within their own lines after having been under antiaircraft fire were so badly damaged by it that they were destroyed in landing; that the friendly aviation was frequently warned by antiaircraft fire of the presence of an enemy not seen by them and so either saved from an unequal combat or given a chance to attack advantageously; and last but not least a very precious service was rendered to the rear areas and to the zone of the interior by the warning given of the passage of enemy night bombers.

I found during my recent trip abroad, during which I spent considerable time investigating the subject of antiaircraft defense, that the leading European countries are convinced of the necessity for antiaircraft defense, and that the belief is general that the efficiency of this defense will rapidly increase due to improvement in training methods and in materiel.

DEFENSE OF PARIS*

Some general information and details concerning the organization of the antiaircraft defenses of Paris will be given because it is believed that this is the best example of the measures which must be taken in the defense of a modern city against attacks by air raiders. The story of the defense of Paris gives one a very vivid picture of the position in which a modern city might find itself if subject to attacks from enemy aviation.

During 1914 and 1915 there was no bombardment of Paris by airplane. Night bombardment effected from a distant base was limited to Zeppelins, and the defense, therefore, was at first organized exclusively against them. In consequence, the aviation, which was the most efficient weapon against dirigibles, was largely developed. At this stage the antiaircraft artillery defenses of Paris consisted of a few guns only, and the defenses were not definitely organized until 1915, while for a considerable time thereafter they consisted only of improvised materiel. Towards the middle of 1916 the menace of night bombardment by airplanes in large numbers began to make itself felt. In 1917 the enemy having built some high-powered Gothas sent them to England. The consequent heavy bom-

*Source of information: "The Defense of Paris against Airplanes during the War," By E. Villaret, Major, C. A. C. Compiled from official French records. [JOURNAL U. S. ARTILLERY, September, 1919.]

bardment of London furnished an example that clearly indicated to the French the necessity of reinforcing the defenses of Paris. Early in October, 1916, the antiaircraft defense of Paris took definite form, a regiment of antiaircraft artillery being definitely assigned to it. At about the same time, some Zeppelins, which were headed toward England, lost their bearings and were stranded in France. Four were brought down. This raid almost definitely marked the failure of the Zeppelin. From then only the airplane night bombardments were to be feared, and early in 1918 the Gothas paid their first visit to Paris. At that time the defense of the aerial zone just over the city itself was assigned to aviation, while the exterior defense was confided to the antiaircraft artillery. After March, 1918, big airplane raids were made on Paris by night. Reconnaissance was made during the day by a few German airplanes, and single machines flew over Paris in daylight at altitudes from 5000 to 6000 yards. At night, and generally on moonless nights, large bombing planes attacked Paris in successive waves at altitudes varying from 2500 to 4500 yards and in squadrons of from 50 to 70 planes.

For the day defenses French aviation made permanent patrols outside the zones of action of the artillery. Batteries were reinforced and grouped to permit great concentration of fire.

As for the night defense, the cooperation of aviation with artillery presented great difficulties and even dangers. It became quite difficult to recognize the nationality of the planes in the field of fire. Also, sound ranging on which the fire was based was seriously hindered. The batteries were also delayed in opening fire. To avoid these difficulties it was decided in March, 1918, to leave the field free at night to the antiaircraft artillery and to use airplanes only in case the artillery proved inadequate.

In order to keep the antiaircraft defenses thoroughly informed, a permanent service of observation of aircraft of all kinds was conducted by a system of special sentry posts called "lookout posts" all through Paris and extending far to the front. This system permitted all movements of the enemy planes to be followed as soon as these planes came within fifty miles of Paris.

The means of defense employed by the antiaircraft defenses of Paris in 1918 were of two kinds: first, passive means; and second, active means.

This passive means consisted either of placing obstacles along the probable route followed by the enemy, which constituted for them a permanent and invisible danger, such as balloons; or of misleading them by means of camouflage of the terrain, such as the use of smoke and false objects. For this defense the following materiel was used: A number of kite balloons with various anchorages were distributed at various points in the vicinity of Paris and in Paris itself. On the alert these balloons were sent up to high altitudes to block most of the routes habitually followed

by the enemy. Smoke generated by special devices was emitted, thus permitting the masking at the most propitious moment of the guide posts which might be used by the enemy. Next to the organization of camouflage by smoke generators, there was added the establishment of false objectives consisting of frail structures and false scenery installed at various distances from Paris at points not vulnerable. The ingenious dispositions of lights enabled the normal activity of all these false objects to be simulated. Finally the lighting of Paris and its environments was reduced to a strict minimum. After February, 1918, in case of the alert signal, darkness was practically absolute.

The active means of defense consisted of a methodical and continual engaging of enemy planes in order to impede their progress and to inflict injury upon or to destroy them, using aviation, antiaircraft artillery, searchlights, and machine guns.

To show the results obtained by the active and passive antiaircraft defenses of Paris, tables are attached.* These tables were compiled from reports checked immediately after each raid. From the table it is seen that of the 485 planes employed by the enemy in attacks on Paris during 1918, only 37 succeeded in flying over Paris, and 13 of these were brought down by the antiaircraft defenses.

TESTS AT FORT TILDEN

As previously stated, the best measure of the effectiveness of antiaircraft artillery is to be found in records of the World War period. In times of peace, when it is impossible to fire guns under combat conditions, the only means of judging the effectiveness of a weapon is by target-practice records and proving-ground tests and by calculations based on target-practice records and proving-ground reports.

The 62d Regiment of Antiaircraft Artillery was encamped at Fort Tilden this summer, and between the months of May and August fired approximately 4,000 rounds of 3-inch shrapnel, 215,833 rounds of caliber .30, and 75,449 rounds of caliber .50 ammunition at sleeve targets towed by airplanes. These practices were held for the purpose of training personnel, testing the materiel, recording the number of hits on a hypothetical target, and the number of shrapnel holes in the sleeve target. For these tests Martin bombers flew at heights and ranges unknown to the firing batteries, towing cloth sleeve targets in the form of a truncated cone 5 feet in diameter at the front, 3½ feet in diameter at the rear, and 15 to 20 feet long. A small steel wire, 2100 feet long was used for towing the target, and the drag of the sleeve and the wire reduced the speed of the towing plane, so that this speed varied between 50 and 70 miles per hour, depending upon the velocity and direction of the wind. The bombers flew straight

*EDITOR'S NOTE: Not reproduced. See COAST ARTILLERY JOURNAL, January, 1926, p. 70.

courses at approximately constant but unknown altitudes. Shrapnel was used in these tests, as it was considered unsafe to use high explosive shell.

In order to judge the results, an observer rode in the plane with an instrument to record the location of the bursts over or short, and above or below the target; and another observer on the ground measured with an instrument and recorded the position of the bursts to the right or left of the target. By plotting the records obtained by both observers, the number of hits were recorded.

The War Department as a result of certain tests (McNair Board report) prescribed that a hit would be recorded if the shrapnel burst 50 yards above or below the target; 35 yards short of or 15 yards past the target; and 50 yards to the right or left, as measured from the ground. The number of holes found in the sleeve targets were also recorded.

It should be understood in this connection that the object to be accomplished by the tests at Fort Tilden was training for the anti-aircraft artillery units and testing of the efficiency of the materiel. As has been stated, shrapnel was used instead of the standard anti-aircraft shell, which is a high explosive shell, while the target was a sleeve, which was of necessity much smaller in dimensions than a bomber. It was necessary, therefore, to judge the skill of the personnel and the efficiency of the materiel by transforming the results obtained as nearly correctly as possible into results that would have been obtained if the standard ammunition could have been used and the target had been a bomber instead of a sleeve. Furthermore, the target could not be examined each time immediately after being towed in front of the guns, so that unless the burst of each shot was observed the effect of each series of firings could not be ascertained.

These tests indicate that on an average 4.6 per cent rounds of 3-inch ammunition fired under similar conditions may be expected to burst within the prescribed limits. Toward the end of the season—that is, during the months of July and August—an average of 5.2 per cent hits was being obtained. All these firings were conducted with the 3-inch anti-aircraft gun, Model of 1918, which was built during the war. The ammunition, fuses, and fire-control instruments (except the height finders) used in these tests were also of war-time manufacture. The altitudes at which firings were held did not exceed 6000 feet, as the small sleeve target could not be seen by the gunners beyond this altitude.

Similar records were obtained with caliber .30 and caliber .50 machine guns firing at low-flying targets. In the case of the machine guns only actual holes in the targets were recorded. These records show that the number of actual hits on the sleeve target was 2.47 per 1000 rounds of caliber .30 and 1.16 hits per 1000 rounds of caliber .50, at mean ranges of 3052 feet for caliber .30 and 3522 feet for caliber .50 guns.

FIRINGS AT ABERDEEN PROVING GROUND

In order to determine the pattern produced by the 3-inch antiaircraft high explosive shell, panel tests have been held recently at the Aberdeen Proving Ground. These tests were conducted by firing the shell against bursting screens and catching the fragments on vertical wooden walls placed at different distances from the point of burst. It is found from these firings that the pattern of the burst of a high explosive shell is irregular and it is therefore somewhat difficult to formulate simple rules as to the relative position of airplane and burst at which shell fragments would hit the plane.

In computing the size of the danger space caused by the bursting of the shell, the dimensions of the target were, of course, taken into consideration. For instance, the modern bombing plane has a wing spread of approximately 74 feet, a length of about 42 feet, and a height of 14½ feet. It was considered in computing the size of the new hypothetical target based on tests at the Aberdeen Proving Ground that the plane would be hit if any portion of it were found within the danger space of the shell. The hypothetical target for the 3-inch gun was therefore determined to be of the following shape and dimensions: A cylinder extending 150 yards short of the target, 25 feet in diameter, in a plinth 22 yards in height and 50 yards in radius. This takes into consideration approximately the average surface of the bomber that would be exposed to shell fragments, this surface varying with the course of the bomber relative to the position of the gun.*

The experiments just referred to indicate that the shell fragments produced with the ordinary design of antiaircraft shell are not sufficiently uniform in size, some being too large, and a great many being too small. It is possible to regulate the size of these fragments by heat treatment of the shell and by the design of the shell, so as to make them much more nearly uniform. Experiments will be made to determine as nearly as possible the best size of fragment, taking into consideration its destructive effect on the plane and the fact that the larger the fragments, the greater the distance at which they will be destructive. It is possible, also, that better distribution of shell fragments can be obtained. At any rate, it may be confidently stated that the efficiency of high explosive shell fire against airplanes can be increased by better control of the fragmentation of the shell.

*For the purpose of plotting hits on this hypothetical target, the towed target would be assumed to be at the center of the base of the plinth. The major axis of the elongated cylindrical portion of the target is to be located short of the towed target and on a mean line from the battery to the path of the towed target for the course in question. The diameter of the plinth is to be at right angles to the mean line from the battery to the path of the towed target. In observing the bursts from the ground, those bursts which fall within a circle 100 yards in diameter, as seen from the observing instrument at the battery when pointed at the towed target, will be considered as hits, providing the same burst as seen from the towing plane plots within the plinth or base portion of the hypothetical target. These bursts which fall within a circle 25 yards in diameter as seen from the observing instrument at the battery when pointed at the towed target will be considered as hits, providing the same burst as seen from the towing plane plots within the elongated cylindrical portion of the hypothetical target.

DISCUSSION OF RESULTS OBTAINED AT FORT TILDEN

From tests made at the Aberdeen Proving Ground with the types of gun and ammunition used at Fort Tilden, the probabilities of hitting the hypothetical target actually used at Fort Tilden and the one later decided upon as a result of these tests are shown for various times of flight in the following table.

<i>Time of Flight</i>	<i>Probability of hitting</i>	
	<i>Old hypothetical target</i>	<i>New hypothetical target</i>
<i>Seconds</i>	<i>Per cent</i>	<i>Per cent</i>
6	43	86
8	37	72
10	32	55
12	29	45
14	26	35
16	22	26
18	20	19
20	17	15

This table shows the probabilities of hitting the target on the assumption that the gun is correctly pointed, no errors having been made by the instruments or personnel in determining the future position of the target or in laying the gun, so that the projectile would reach the future position of the target at the same time the target does. These results were obtained by most careful firings at the proving ground and by locating the bursts by special measuring instruments. From the data so obtained the probabilities were computed by the ordinary mathematical methods.

It will be noted that the probabilities of hitting either target decrease quite rapidly as the time of flight increases. About one-half of this decrease in accuracy is due to the decrease in accuracy of the powder-train fuse. There is every reason to hope that the new mechanical fuses which we have under development will materially improve the accuracy of antiaircraft shooting when the time of flight is greater than 12 seconds. This accuracy of gun and ammunition will also be improved by the adoption of a non-hygroscopic powder which will not have its power varied irregularly by irregular absorption of moisture in storage and on the battlefields. Such powder is now under development. The new flashless powder, while not affecting the accuracy of fire when the new computing instrument referred to later is used, will aid the antiaircraft defense materially as the position of the guns will not be disclosed when firing at night. By careful selection of shell as to dimensions and weights and grouping them in lots so that the shells of each lot will vary as little in dimension and weight as possible, greater accuracy of gun and

ammunition should be secured. A project to this end has now been inaugurated. Our new models of antiaircraft guns will have a muzzle velocity 400 feet per second greater than that of the guns used at Fort Tilden, and our latest models of antiaircraft shell will by their streamline form, encounter much less air resistance than the shrapnel used at Fort Tilden. Both of these factors will increase the accuracy of antiaircraft fire by decreasing the time of flight for a given range. It is fair to assume that the theoretical accuracy of gun and ammunition as shown in this table can be very materially increased.

The most illuminating conclusion that can be drawn from a consideration of theoretical probabilities of hitting the airplane, on the assumption that the gun is correctly pointed, results from a comparison of these probabilities with the hits in the practice at Fort Tilden. The average time of flight at Fort Tilden was about 10 seconds, and from the table above it appears that the number of hits on the hypothetical target actually used should have been, if the guns were correctly laid, 32 per cent, or using the new hypothetical target determined at Aberdeen, this figure should have been 55 per cent. Actually the percentage of hypothetical hits for the whole practice was about 4.6 per cent. Here is a tremendous discrepancy between the percentage of hits actually obtained and the percentage that should have been obtained if the guns had been correctly pointed at all times; and it leaves a tremendous field for improvement in accuracy of antiaircraft fire, using the same guns and ammunition as were used at Fort Tilden.

It is the function of the personnel and the fire-control instruments which they use in antiaircraft practice to put the center of impact in the right place, and it is fair to assume that a large part of the correctable error may be charged to the fire-control instruments used. How great this error is cannot now be stated, but the present instruments are being tested at the proving ground and their degree of accuracy when used against an actual airplane target will be obtained by means of the camera obscura installation. It may be said in this connection, however, that the principal errors should be found in the R. A. corrector of French war-time design which, with the height finder, constitute the basic instruments for determining the future position of the plane.

Among the most important defects of the R. A. computer are the following: It computes the requisite data only approximately; it does this intermittently, once in eight seconds, for the position of the plane after an interval of eight seconds plus the time of flight of the projectile. It does not compute the actual elevation of the gun to hit the plane in its future position, but only the angle to be added to that given by a cannoneer at the gun by pointing his telescopic sight at the plane. Similarly, the R. A. instrument does not compute the actual angle of azimuth

at which the gun must be set to hit the plane in its future position, but only the angle of azimuth at the gun described by the plane during the time of flight of the projectile, making it necessary for another cannoneer with a second telescopic sight on the gun to keep the gun continually pointed at the plane. Moreover, the gun should be fired exactly eight seconds after the R. A. computer furnishes the data, since this instrument is constructed on the assumption that it will take just eight seconds to load, aim, and fire the gun after the firing data are communicated to the firing squad.

A new and improved data-computing instrument is designed along more scientific lines than the R. A. corrector. The data computed by it are exact. Moreover, the data do not have to be telephoned to cannoneers at the gun to be set off on sights and other instruments. By an electrical transmission system the computing instrument itself moves azimuth and elevation pointers on the gun carriage and keeps these pointers continuously set to indicate how the gun should be elevated and traversed to hit the plane. No sights on the gun are required and the cannoneers at the gun have only to elevate and traverse the gun until other pointers actuated by these movements match the pointers controlled by the computing instruments. The personal errors of the two men at the two sights on the gun are therefore entirely eliminated in the new system and a material increase in accuracy of fire should result therefrom. A pointer on the fuse setter will also be kept continuously set by electrical transmission from the computing instrument, while another cannoneer will keep the fuse setter continuously set by turning a crank thereon to match the fuse setter pointer with that controlled by the computing instrument.

This new instrument practically does away with all personal errors at the gun except those very slight errors which may occur in the comparatively simple act of matching pointers; and, moreover, the gun is continuously pointed according to the data determined and can be fired as soon and as often as it can be loaded. With this system, too, the computing instrument has only to predict the future position of the target over a time interval of flight.

There is also under development a relatively simple and promising device that will do away with the necessity of manually elevating and traversing the gun and turning the fuse setter to match pointers. By this device—an electrical and mechanical combination—the gun will be pointed and the fuse setter kept set by the computing instrument, so that all the cannoneers at the gun will have to do is to insert the cartridge in the fuse setter, withdraw it, and load it into the gun.

We can then say we are on the eve of removing all the personal errors that occur at the gun, and there remain only the personal errors of

the men operating the computing instrument, the height finder, and the wind computer, as well as the errors, if any, inherent in the instruments.

The height finder is an instrument constructed on correct scientific principles. The one used at Fort Tilden has a 3-meter base. Its accuracy depends on the training and skill of the operator, but this accuracy for a given operator will increase directly as the length of the self-contained base. If the height finder is responsible for an appreciable part of the inaccuracy of antiaircraft fire, one with a larger base can be obtained. The only limit to the length of base is the mobility of the height finder and its means of transport. So long as this is not less than that of the 3-inch gun and carriage, it will not be objectionable.

The following table gives the probable errors of a skilled man, using height finders of varying lengths of base in determining varying altitudes at a horizontal range of 5000 yards.

APPROXIMATE ERROR OF READING

<i>Altitude</i>	<i>Length of base</i>		
	9 feet	12 feet	18 feet
<i>Yards</i>	<i>Yards</i>	<i>Yards</i>	<i>Yards</i>
1000	4.7	3.5	2.4
3000	18	13	9
5000	34	26	17

It is not considered that the instrumental errors of the wind computer are serious, though there is undoubtedly a possibility of improvement of the instrument.

The method of correcting for the "conditions" of the day is taken from the French. The accuracy of this method is now being investigated, and it is not unlikely that improvements therein may be made.

Finally, accuracy will, of course, improve with continued training of personnel; and it should be remembered that until the last two years, the antiaircraft artillerists have had no target to shoot at. Imagine for example, the difficulty of developing expert infantry riflemen if there were no targets available for them to shoot at during their training.

So far as day firing is concerned, therefore, there is every reason to expect a large increase in the accuracy of antiaircraft fire with the improvements in materiel contemplated and with continued training of personnel. We should also bear in mind that during the day enemy bombers will not operate singly against ground targets if we have any pursuit planes available to attack them. Instead they will fly over their objectives in formations which cannot dive, turn, or zig-zag as a single

plane may do, and they will present a large and distinct target to the defending antiaircraft guns.

NIGHT FIRING

The accuracy of the night firing at Fort Tilden was, on the whole, greater than that of the day firing, and I think it can be stated that a plane illuminated at night by a searchlight is no more difficult to hit with antiaircraft guns than the same plane in daylight. To illuminate hostile planes with searchlights it is necessary first to locate them. At present this is done with sound apparatus, ordinarily called "listening devices." While these devices are in an early stage of development, very gratifying results were obtained with them this summer at Camp Dix. When four listening devices and four searchlights were used there was no failure to put the searchlight on a plane towards the end of the season's practice. The maximum range of our present listening device is approximately 12,000 yards. That of our present searchlight having six hundred million candle-power is from 6,000 to 15,000 yards, depending on atmospheric conditions. A new searchlight has recently been developed under the direction of the Corps of Engineers which has one billion candle-power.

The development of listening and other devices for the purpose of locating airplanes when they cannot be seen is still in its infancy, but promising experimentation along these lines is being carried on in this country and abroad. All listening devices so far used depend upon the human ear to receive the sound waves gathered by the horns of the instrument. A most promising development of listening devices, however, contemplates the substitution of electrical detectors for the human ear. It is hoped and expected that this improvement may lead to great increases in the accuracy and range of the devices, even to the point where the searchlights may be dispensed with and guns accurately pointed with the data furnished by the listening devices alone. A prominent European designer of antiaircraft fire-control instruments told me this summer that he had great hopes of the development of such an improved listening device within a year.

It is interesting to note that the improved computing instrument previously referred to is well adapted to the computation of firing data for antiaircraft guns in connection with this proposed improved listening device, when for any reason the plane cannot be seen from the computing instrument. In this case the operators at the instrument would follow the movement of pointers actuated by the listening device instead of following by means of telescopes the movement of the plane.

MACHINE-GUN FIRING

The results obtained with machine guns at Fort Tilden this summer are far below that might be expected if only the inherent accuracy of gun (not including the mount) and ammunition is considered. A long series of firings by the Ordnance Department with machine guns shows that with the regular infantry mount and with the guns clamped to prevent vibration, practically all projectiles should hit a vertical target eight yards high by six yards wide at a range of 1000 yards, and that about 25 per cent of the projectiles should hit a vertical target one yard high by three-fourths of a yard wide at the same range.

If the machine is held like a cannon rigidly in its mount the cross-section of the sheaf of projectiles—that is, what corresponds to the pattern in the shot-gun—is really too small for effective fire against airplanes as near as 1500 yards or less from the guns, unless taken care of as indicated later. On the other hand the mounts used at Fort Tilden, with the guns free for pointing and steadying with the shoulder of the gunner, permitted for guns to vibrate in all directions to such an extent as to cause excessive dispersion of the projectiles.

The obvious remedy is, first, to provide more substantial mounts of the pedestal type with elevating and traversing gearing. It appears now that each mount should carry at least four guns of .30 caliber and as many as possible of .50 caliber. All guns carried by one mount would be synchronized to fire in unison by one trigger and such mount would be transported by and fired from a truck or trailer. But with these guns so mounted the pattern of each gun will be too small. This can be remedied by adjusting the guns of one mount so that their combined pattern will be about four times or more larger than that of one gun. Deflections can be set off from one mount to another in a battery so that what may be called the pattern of the battery will be of substantial size, approximating or perhaps exceeding the danger area surrounding a bursting 3-inch high-explosive shell.

It is quite possible, mechanically, to provide a machine-gun battery pattern of this kind, and when this is done with the improved mounts under consideration we may expect a decided improvement over the results obtained this summer at Fort Tilden with machine guns.

With improved machine-gun mounts and with a reasonable pattern we must thus improve our facilities for placing and holding this pattern on the plane. These improved facilities will include a telescopic sight of large field and low power, an improved range finder, and an improved speed indicator. At very short ranges the gearing of these mounts may have to be released and the gun made free for following the rapid movements of the plane by pointing with a shoulder rest. In this case

the fire will be controlled by directing at the plane the trajectory which will be brightly outlined by tracer bullets. For use in certain positions where the terrain or other conditions may make it desirable, simple tripod mounts should be provided. These are light and may be carried as additional equipment on the trucks or trailers of the pedestal mounts. Extra guns for the tripod mounts will not be required, as when they are used the guns may be transferred to them from the pedestal mounts. If preferred, extra guns for the tripod mounts can be provided.

37-MILLIMETER GUNS

The 37-mm. antiaircraft gun is only now under development. The method of fire control with this gun will be similar to that used with antiaircraft cannon of larger calibers. As the projectile of this gun is fused to burst only on impact with the plane, it is not improbable that it will be found advisable to design a mount that will carry several guns and to arrange for a reasonable pattern at the target as proposed for machine guns.

CONCLUSIONS

In conclusion, I am convinced that with provision for liberal training and for continued development of materiel along the lines already well established, the effectiveness of antiaircraft fire will increase so that the combat between planes and guns on the ground will by no means be an unequal one. I believe that the losses of planes that may attempt during the day to bomb objectives protected by improved antiaircraft guns and machine guns will be so great that the commander will hesitate to order such bombing unless the object to be obtained is so vital that he can afford to suffer a great loss of planes in the operation. Even at night the combat between planes and antiaircraft guns will not be an unequal one. To be sure the planes will probably attack singly and they will be in a measure protected by darkness, but this will also add to the difficulties of their mission and they will always run great risk of being located by the improved listening devices and searchlights that undoubtedly will be developed for that purpose.

In stating my belief as to the efficacy, present and future, of antiaircraft guns, I do not want to give the impression that I do not appreciate the powerful offensive properties of the airplane. The airplane is a wonderful weapon for offense and for defense, particularly against attack from the sea. Its possibilities are enormous and we should aim to develop these possibilities to the fullest extent. We should have an air force at least equal to any that may be brought against us from overseas. But the very power of the airplane in offense emphasizes the need for an antiaircraft gun defense.

The Ordnance Department of the Army is charged with the design, procurement, supply, and maintenance of the weapons and ammunition used by the Air Service, and also the weapons and ammunition used by the antiaircraft defense. It must develop the most efficient armament for both services and be prepared to supply this armament in the amounts and at the times and places required. From the nature of its functions it must see both sides of the question.

As an ordnance officer, I am impressed with the necessity of developing both services to the maximum extent permitted by appropriations, in accordance with the defense plans of the General Staff. Both services are new and of outstanding importance. In my opinion they present the most pressing technical problems which the War Department must solve at the present time.

No one can wish more sincerely than I do that we may not be drawn into the conflict in which the European Powers are now involved; but at the same time no one is more anxious that we should make every possible preparation to meet such an event, if it should be unavoidable. In order to do this, we should embrace the present moment to make our establishments as respectable as circumstances will permit, and neglect no opportunity of introducing into them every improvement in the military art that may be useful.—*George Washington to Governor Rutledge of South Carolina, September 9, 1799.*—

The Fundamental Principles of the Art of War Applied to the Problem of Coast Defense

By

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"I have but one lamp by which my feet are guided, and that is the lamp of experience. I know of no way of judging the Future but by the Past."—PATRICK HENRY.

THE successful accomplishment of the mission of Coast Artillery, like that of any other enterprise, calls for three successive phases: the conception, the preparation and the execution. The proper solution of each of these problems must be based upon certain fundamental laws or principles, which never change, because, as Bernhardt says, "they are based on human nature and the very essence of the use of force."¹ The study of Military Art, which is essential for the proper application of the Principles of War, becomes, therefore, a matter which no officer can afford to overlook. These immutable principles are:

- The Principle of the Objective.
- The Principle of the Offensive.
- The Principle of Mass.
- The Principle of Economy of Force.
- The Principle of Movement.
- The Principle of Surprise.
- The Principle of Security.
- The Principle of Simplicity.
- The Principle of Cooperation.

Military History teaches the true meaning of these principles through the proper presentation of the masterpieces conceived by the great Captains of the past, and its study is, therefore, essential for the understanding of the true conception of troop leadership. It would be unreasonable, however, to expect that study alone will turn an ordinary soldier into a military genius, or that it will supply initiative and energy to a weak and vacillating character; nevertheless it will convert a good soldier into a

¹*The War of the Future*, General von Bernhardt, German Army.

better one and it will greatly help a Commander to arrive at the correct decision at the critical moment. In fact, a study of the progressive course that the Art of War has followed in the past is the best and most logical method of determining the lines along which it will develop in the future. History repeats itself, and the successful Commander will be the one who can easily perceive the similarity between past and present campaigns and profit by the experience of others.

Many centuries have passed since the power of Rome was still in the making; civilizations have risen and vanished since Alexander went from the banks of the Nile to the Indus; and the conquest of Asia Minor by Cyrus is merely a chapter in our Ancient History. The weapons and appliances of the present time are vastly different from those used in early days and military ingenuity has made enormous strides, yet the same fundamental principles of war prevail today as much as they did hundreds of years ago. This truth is once more revealed by the World War, and we find that the old principles of strategy and tactics still governed in recent encounters and were not completely revolutionized by modern warfare, as might be supposed. In the brilliant victory obtained by Hindenburg and Ludendorff at Tannenberg in 1914, and again in the Winter Battle of the Masurian Lakes, we see these two German masters putting into execution the simple strategic scheme used by Hannibal against the Romans at Cannae in the year 216 B. C. And, going still further, if we analyze the battle scheme of Frederick the Great at Leuthen in 1757, of Napoleon in his most important battles, of Moltke at Konniggratz in 1866 and again at Sedan in 1870, we find that they were merely modifications of the battle schemes conceived and executed by Hannibal and Epaminodas many years before the Christian era.

"The experience at Tannenberg and the great battle of the Masurian Lakes," writes Ludendorff in his *War Memoirs*, "had shown that a great and rapid success can only be obtained when the enemy is simultaneously attacked on both flanks." In other words, the double envelopment scheme of Hannibal at Cannae served as an inspiration to the great German tactician in 1914, and it was just as successful when used against a modern army, equipped with modern war appliances, as it was before the Christian era when used against the brave Roman legions. Similarly, the principles of Coast Defense have not changed, and the difficulties lie in their proper adaptation to the complicated methods brought about by the introduction of new weapons.

The defense of our Coast is not a new problem. During the Revolutionary War and the War of 1812, Boston, New York, Philadelphia, Baltimore, Washington, Charleston, Savannah, Mobile, and New Orleans were subjected to powerful attacks. There is but a single instance in the war of 1812 where the enemy's vessels succeeded in reducing a fort. This

was the capture of Fort Washington in 1814, and it is a well known fact that this fort was small, incomplete and poorly defended. Science and invention have led to the introduction of new and powerful means of warfare, so that at present we recognize that Harbor Defenses are subject to attack from the air, sea, or land, and it is very probable that this attack will be simultaneously conducted in at least two of these elements, which will require, therefore, identical means of defense to repel it. Let us, then, analyze these three methods of attack.

THE AIR ATTACK

The Air Service has made a tremendous progress in recent years, and today it constitutes one of the most important elements of modern warfare. Due to the weight of explosives that can be carried by the big bombing planes, an air attack constitutes a serious menace to a Harbor Defense, but an air attack alone is not sufficient to accomplish decisive results. For years the Germans tried without success to wreck the flood gate at Dunkirk by aerial bombs. The battle cruiser *Goeben*, aground for a week, was bombed many times, but, in spite of that, it proceeded just the same to the Black Sea. The naval ports of Ostend and Zeebrugge, which were used by the Germans as submarine bases during 1916-18, were comparatively close to the front line and were repeatedly bombed by the Allies throughout these years; in spite of this, it was found necessary to resort to the old methods and raid these places from the sea during 1918 with a naval force consisting of a large number of vessels and hundreds of men.

Is the United States in danger by air attack from any potential enemy of menacing strength? The President's Air Board, after a full and intelligent investigation, answers this question in the following manner:

Our answer to that question is *no*. No airplane capable of making a transoceanic flight to our country and of returning to safety is now in existence. Airplanes of special construction and in special circumstances have made non-stop flights of 2520 and 2730 miles. Neither of the airplanes which made these flights carried any military load. Both flights were made under as nearly ideal weather conditions as possible, the purpose being record-breaking performances. The mere fact of the distance covered in the flight is, therefore, no criterion of the ability of airplanes to make transoceanic flights of equal distances under war conditions and with an effective military load. Although there is some variance in the testimony on this point, it seems to be the consensus of expert opinion that the effective radius of a bombing plane is at present between 200 and 300 miles. By effective radius of flight of a bombing airplane is meant the distance from the point of departure to an objective which this airplane could bomb and then return to its starting point.

It is claimed by some Air Service advocates that "it is very feasible and very easy to fly from Alaska to Siberia or *vice versa*, and that in case of a war with an Asiatic Power, we will be attacked from the air by way

of Alaska."² How soon are events forgotten! There has never been an aerial expedition prepared with more foresight or efficiency than the Around-the-World Flight. The machines were especially designed and equipped for this flight; the aviators and mechanics were carefully selected and rigorously trained; spare parts and motors were shipped to various places for use by the aviators in case of necessity; officers were sent ahead of the fliers to prepare buoys and landing places; climatic conditions were very carefully studied and the time of the year selected as most suitable for the flight.

A study of climatic conditions convinced Brown and Street that the safest way to fly around the world would be in the opposite direction to that which had been taken by the aviators of all other countries. By flying west instead of east, the American aviators were able to get through Alaska *before the fog closed down completely*, to get from Japan to China ahead of the typhoon season, to miss the monsoons in Burma and India, and then to cross the North Atlantic before the Arctic winter came.³

The expedition started, and a few days later we learned the distressing news that Major Martin, the Flight Commander, had encountered disastrous weather conditions, his plane had crashed into a mountain between Chignick and Dutch Harbor, and he and his mechanic had miraculously escaped death. Answering a question in regard to weather conditions, particularly in the Aleutian Islands, Lieutenant Leigh Wade, A. S., one of the World Fliers, said:

Most of the time the weather was terrible. On leaving Seattle, for an hour and a half after we departed from there, we had clear weather. From there, almost all the way into Prince Rupert, we had every kind. On leaving Atu Island, which was our last stop, we started across the Behring Sea for Japan. We were forced to detour off the course due to the large storm area around the islands there, and leaving there, we had bad weather, especially fog, all along the Kamtchatka Peninsula, low-flying weather. We eventually ran out of the fog, but we ran into a terrible storm coming up from the Southeast, when we were making the 150 miles into Shimsu.⁴

We have read in the *First World Flight* that the first leg across the Aleutian Islands was the hardest and most trying one, that, as a native of Dutch Harbor told the aviators, "there are but two seasons here, this winter and next winter," and that this part of the trip was negotiated with the utmost difficulty. And now we hear that this same journey can be easily made by slow bombing planes manned, not by our most experienced and skillful pilots, but probably by reserve pilots, hastily called into active service and who, therefore, will have had neither the experi-

²From testimony of Major T. C. Lamphier, A. S., before the President's Air Board, September 28, 1925. Colonel William Mitchell, A. S., also maintains that this country lies exposed to an air attack by way of the Aleutian Islands. Testimony given on September 29, 1925; also in *Winged Defense*.

³The *First World Flight*, as related by the Fliers to Lowell Thomas.

⁴Testimony of Lieutenant Leigh Wade, A. S., before the President's Board, September 30, 1925.

ence, training, nor endurance that our Around-the-World fliers had. We can very well visualize what would happen if we, considering the Principles of War as bunk, make our Air Forces independent of all other branches. An enthusiastic Chief, believing his Air Force alone able to win the war and desirous of proving it, could assemble his pursuit, bombardment, and attack planes right at the outbreak of hostilities, and, mounting one of his planes as Don Quixote did his Rosinante in the old knighthood days, could start out on his expedition against that Asiatic Power by way of these cold regions. Encountering the terrible weather conditions that Lieutenant Wade mentions, he would lose, to put it mildly, about one-half of his planes, while the other half would reach that Asiatic country, discharging its bombs and doing considerable damage to cities and undefended centers. We have not considered in this hypothesis the fact that the enemy Air Forces, fighting at home and with well-provided bases, could easily inflict terrific punishment on our Air Forces operating at such an enormous distance from home and facing so many difficulties. The damage done to cities and undefended centers will in no way decide the war. The result of this expedition will simply have been to deprive the Army and Navy Commanders of the supremacy of the air and seriously to handicap all offensive and defensive operations, which would necessarily bring disastrous results, because in the early stages of a campaign, before close contact with the enemy has been established, the military commander must depend largely upon his Air Force for the necessary information upon which to base his plans. Let us take our own case. Suppose that an enemy Air Fleet comes to this country, drops a few bombs in New York, Philadelphia, or other cities, and destroys a lot of property. Does this mean that we have lost the war? Paris was bombarded by the famous long-range German gun for forty-four days, during which time not less than one hundred and eighty-three projectiles fell within the city area doing considerable damage. London was repeatedly bombed by Zeppelins; yet we know that these attacks had no effect whatever upon the outcome of the War.

During the World War extravagant tales of havoc done to enemy cities and installations were often brought back, in good faith, no doubt, by some of our aviators, but investigations after the Armistice failed, in the majority of cases, to verify the correctness of such reports. Again, the damage done to Allies by the enemy's bombing craft, including Zeppelins, was almost negligible, even from a material point of view, certainly so from a morale point of view and its effects upon the final results. Of course, some damage was done by aircraft bombing, and it would doubtless be somewhat greater in another war, but until it becomes vastly more probable than at present demonstrated, then it cannot be said that we are in position to abandon past experience in warfare.⁵

⁵Final Report of General John J. Pershing, as Chief of Staff of the United States Army, 1924.

During the War of 1812, the British sent across the ocean a fleet which landed on the shores of Chesapeake Bay and, marching into Washington, burned the Capitol and other public buildings; but this act of destruction only served to stir the patriotism of all Americans and to augment their love for those great principles of human freedom that secured for them Liberty and Union forever. When Lee was retreating from the Richmond defenses, Meade ordered Sheridan to cover Richmond instead of moving against Lee's Army. Grant went to Meade and said: "I do not approve of your march. I do not want Richmond, so much as Lee. Richmond is only a collection of houses, Lee is an active force. Your business is not to follow Lee, but to cut him off."

We may truly state that the Air Service is an important element in a well-balanced Navy and an efficient Army; that, as an auxiliary branch, it has performed yeoman work in the past, and, as such, will be indispensable in the future; that the main objective of enemy aircraft will not be to damage cities, but to protect the capital ships and carriers of the Navy from attacks by our bombing planes, to secure supremacy of the air by driving off all our aircraft, to spot for artillery, to locate vessels, either moving or lying at anchorage in hidden places, and to reconnoiter and determine the dispositions and means of the defense, trying at the same time, to destroy or neutralize those fortifications protecting the main harbors, so as to establish land bases for extended operations. After all this the destruction of cities will be a comparatively easy task.

The Principle of the Objective cannot be disregarded. No one arm wins battles; success can only be achieved by the combined employment of all of them.

If we refer to the pages of History, because, in the words of Patrick Henry, "we know of no way of judging the Future but by the Past," we see that Unity of Command is a fundamental principle of the Art of War, and the Command is weakened whenever any of its elements are withdrawn from it. All the means must be carefully balanced. It was in this manner that Philip of Macedon and Alexander the Great, for example, were capable of defeating the vast Persian hordes. A study of the foremost military campaigns of ancient and modern times shows that the Command must have a complete disposal of all its means, and that success can only be achieved when all branches work as a team, each one playing the part for which it is best fitted, but always under one supreme, intelligent leadership. It often happens that a person specializing along a certain line is apt to overlook the importance of all others by seeing only the value of his specialty. At the outbreak of war aviation was in its infancy; the airplane was by no means the weapon that it is today. It was slow in performance, few in number, and its mission was, at first, limited practically to reconnaissance. Aviation has since made tremendous progress; the speed

of the fastest pursuit planes now in the service is as high as two hundred miles per hour; the weight-carrying capacity of the big bombing planes has increased twenty-fold; the destructive effects of bombs and the bombing accuracy have similarly increased in gigantic proportions; the world has been circumnavigated by air; and what is more, aviation is still progressing at a fast clip. But, in spite of all this, the fact still remains that aviation is simply another extremely powerful means furnished to the Commander, who must study its powers and limitations in order properly to combine it with the other means that have been placed at his disposal for the successful accomplishment of the enterprise.

During the World War, the director of motor truck construction said: Without trucks the war can't be won. Said the military leaders, Without an army the enemy can't be defeated. From the Navy came the cry, Without our protection the Army and the trucks can't reach France. We are the eyes of the armed forces of the Nation, nothing can be accomplished without our help, said the aviators. Food will win the war, insisted Mr. Hoover. Ships! Ships! More Ships! Build a bridge of ships to Pershing or democracy is lost! shouted Frederick Palmer. Subscribe to the Liberty Loan, and win the war, urged Secretary McAdoo.⁶

And we may correctly state that the war was won, not by any one of these agencies alone, but by their proper coordination under one intelligent leadership.

The logical conclusion is that the Air Force is as much a part of the Army as the submarine is of the Navy, and we know that a submarine officer must receive just as much special training as an Air officer; yet no one would think of detaching the undersea craft from that of the surface. There must exist the best feeling of mutual cooperation, understanding, and support between our antiaircraft forces and our Air Forces. If efficient, the former can take care of the defense of areas, thus leaving the Air Force free to go and attack hostile air forces or important objectives. The whole thing reverts to the proper application of that great principle of war, *Economy of Force*, which, in the proper sense, means the successful accomplishment of a task using the *least* number of forces. If we have a highly trained and efficient antiaircraft defense, then our Air Force can be used for other useful purposes, instead of being tied down to the defense of localities.

ANTIAIRCRAFT DEFENSE

Antiaircraft defense, like aviation, practically had its birth during the World War, attaining a comparatively high stage of efficiency towards the end of the struggle. The airplane developed very rapidly; its mission did not limit itself to that of reconnaissance alone. The aviator, who was at

⁶*Community Life and Civic Problems*, Hill, pp. 13-14.

first provided with automatic pistols fitted with shoulder pieces, became later on equipped with machine guns and with other guns of even higher caliber with which he could not only defend himself, but could attack hostile planes and even ground troops. Bombing operations soon became one of the most important missions of aircraft. As a result of this development, antiaircraft defense became imperative, and we find that at the end of the war practically all the belligerents had a well organized anti-aircraft defense system, as may be seen from the figures given in the following table.⁷

<i>Nation</i>	<i>Planes brought down by the Air Forces on all Fronts</i>	<i>Planes brought down by antiaircraft</i>	<i>Ratio</i>
Italy	540	129	1:4.2
France	6554	1520	1:4.3
Germany	2000	500	1:4

The above figures show that the number of planes brought down by antiaircraft was roughly equal to one-fourth that brought down by the Air Forces, which is a most favorable comparison when we consider the fact that the role of antiaircraft is a purely defensive one, while that of the Air Forces is mainly offensive. Moreover, the real worth of antiaircraft cannot be based upon the actual number of planes brought down, because compelling an enemy to change its course or to fly at a high altitude where the work of reconnaissance cannot be carried on, or compelling a bomber to carry out its bombing operations at an altitude which renders this work utterly ineffective, or hampering the taking of photographs, are accomplishments of great value.

The effectiveness of antiaircraft fire has been revealed by secret German documents, the contents of which were disclosed at the recent Mitchell trial. It has also been told in detail by military men well versed in the subject. Neuman, for example, tells us in his book referring to the battle of August, 1916, between the Somme and the Avre: "The number of victims that the antiaircraft batteries have bagged from the air is also large, seventeen machines fell to their guns alone on the 8th of August, 1916. A glorious day for 'Archie' on the Somme and the Avre."⁸

As the efficiency of antiaircraft artillery increased during the course of the war, the number of rounds fired per plane brought down decreased, as may be seen from the following table.

⁷From Official Italian Report *Ministro della Guerra, Comando Superiore d'Aeronautica*. C. A. JOURNAL, March, 1925.

⁸*The German Air Force in the Great War*, by Major Paul Neuman, German Air Force.

<i>Year</i>	<i>Number of rounds per plane</i>	<i>Nation</i>
1916	11,000	France
1918 (latter part)	3,200	France
1917	8,400	England
1918 (early part)	4,550	England
1918 (latter part)	1,500	England

As a post-war antiaircraft materiel, we have the .50-caliber machine gun, which is now the standard, with a rate of fire of from 400 to 500 shots per minute, able to maintain a barrage through which, up to a certain altitude, it will be impossible for an enemy plane to pass; the 37-mm. full-automatic high-powered gun, which fires a 1¼-lb. shell at a rate of 100 shots per minute; the 3-inch gun, with a vertical range of 27,000 feet; and the 4.7-inch gun, which has a range equal to the maximum range at which airplanes will ordinarily be visible. Studies are being made to improve our present fire-control system, and there is no doubt that by proper cooperation antiaircraft fire will be so highly developed that the slow low-flying bombing planes will prove easy victims.

History shows that human ingenuity has always devised an efficient weapon to counteract each offensive weapon that has been invented, thus either nullifying or minimizing its advantages. We have the artillery and hand bombs for use against machine guns, the gas masks for the deadly chemical gases, the blister for the torpedo, the land mine and anti-tank guns for the tanks, aircraft, depth bombs and destroyers for the submarine, and, last but not least, aircraft and antiaircraft guns for airplanes. American inventive genius and skill should satisfactorily solve this problem in the same businesslike and efficient manner in which they have solved similar problems in the past. The importance of the Principle of Cooperation cannot be overemphasized; we must all work together as a team.

THE SEA AND LAND ATTACKS

We conceive that a Harbor Defense and Land attack may be divided into three different phases, which will merge more or less rapidly one into the other. The first will be the long distance phase—the aircraft and submarine phase,—during which the hostile fleet will be out of range of projectiles from our shore batteries; the second phase will be the naval attack; and the third and final phase will be the landing attempts and land attacks.⁹ These last two phases may be simultaneously carried out, depending upon the circumstances.

⁹Major General John L. Hines in the *Evening Star*, Washington, D. C., April 8, 1925.

FIRST PHASE

In the first phase, the attacking party is normally handicapped for the following reasons: The fleet cannot carry as many planes as can be operated by the Army, and it is obvious that this gives the Army a decided advantage; the platform available for launching the planes is small, unstable, and so exposed to attack as to make it almost impossible to launch a sufficient number of planes to cope with an air force acting from a land base; the fuel and repair stations of the attacking Navy are only temporary and must have limited capacities, while the defense can rely upon permanent stations which are superior in every way and also more accessible and better equipped to undertake repairs. And so we come to the first conclusion: The air attack on fortifications is more likely to come from land forces, or in other words, after the enemy has made a successful landing and secured a foothold on land for the establishment of a base of operations.

SECOND PHASE

The second phase presupposes a naval superiority by the attacker, which can be obtained only after our Fleet has been either destroyed or defeated. The function of the modern warship is chiefly the attack on other ships; the attack on seacoast forts is only secondary. Moreover, the fire of well-handled shore guns is today so rapid and so accurate that no fleet will expose itself to its effects save under emergency. The vulnerability of a ship offers a marked disadvantage, and considerable risk is involved even though the fortifications may not be of the most modern type. This risk becomes even greater because of the difficulty of replacements. Past experience shows, besides, that in very few instances have shore fortifications been destroyed by naval attacks. Referring to the attack of February 25 on the Dardanelles, we quote from the diary of H. M. S. *Queen Elizabeth*: "This bombardment made us realize that to put a fort out of action, it was necessary to get direct hits on the guns. The Turks fought their guns most gallantly and from time to time we all thought that they would be abandoned as each succeeding shell fell in the emplacement; but the guns, which were mounted on disappearing carriages, invariably reappeared and replied to our fire." So we can safely arrive at the second conclusion: As long as the range of our Harbor Defense guns is relatively equal to that of the naval gun, our Harbor Defenses will never be attacked. Admiral Mahan said: "Some of the greatest battles of history are those that are never fought." And it may be safely affirmed that our Harbor Defenses will have answered their purpose to a fuller degree by dissuading a naval enemy from attacking than by repelling an actual attack.

THIRD PHASE

Military History proves that it is by no means easy to capture a well-defended harbor by the means at the disposal of the Fleet alone and that the cooperation of a strong land army is considered essential to support the naval attack. We come, therefore, to the third and most important phase: the land attack.

History again tells us that forced landings are a normal part of naval attacks. On July 26, 1758, when General Amherst captured Louisburg, the "keystone" of the arch of French power in America, thereby clearing the way for the culminating attack on the fortress of Quebec, the land attacks were the telling blows. Similarly, land operations gave General Howe control of New York City during the Revolutionary War; Sebastopol was captured by the Allies in 1855 with land forces; the American squadron wasted its ammunition at Santiago, but here again land operations proved their worth; the Japanese Fleet failed to destroy the fortifications of Port Arthur and the brilliant victory which marked the surrender of the Russian fortress can readily be traced to the heroic exploits of the Japanese Army; the German fortress of Kiao-Chao fell in 1914 due to the pressure of the land forces; and the main efforts made by the Allies against the Dardanelles in 1915 were military efforts. When they failed, the operations failed.

In making an estimate of the situation, we see that the two opposing fleets must make their main effort against one another. We can safely deduce, therefore, that the forces available for attack against our coast will be composed either of such ships as can be spared from the main engagement or the remnant of the fleet after it has been victorious in a general action. The next important point to be considered is the enemy's objective. In the case of the United States let us enumerate the movements of an enterprising enemy: (1) Destruction of naval bases and arsenals; (2) attack against large commercial and railroad centers of the coast; (3) destruction of the merchant marine sheltered in the harbors or at the mouth of great rivers; (4) and attempt to secure a suitable harbor in which a base for future operations by sea or land may be established. The length of our coast line makes its secure fortification a matter of great difficulty, and it is for this reason that the problem of preventing an enemy landing assumes such a great importance.

An attack may be either a feint attack or demonstration, such as that made at Zeebrugge in 1918, or a real attack with the intention of seizing a beachhead and establishing a base of operations, such as the attacks on various parts of the Dardanelles in 1915. A feint attack seldom deceives an alert defense, while an actual forced landing is not an easy operation by any means and, even when conditions are favorable, is a risky and diffi-

cult undertaking. The forces cannot land until the weather permits, and the Navy must be prepared at a moment's notice to take advantage of the first opportunity that may come up. Transports, boats, and lighters must be gotten overboard, and while the landing is going on and also after it has taken place, the ships must be prepared to render the artillery support required for an operation of this nature. Nevertheless, a well-prepared enemy can surmount all these obstacles; and the prevention of a successful landing constitutes, therefore, a problem of primary importance, the proper solution of which depends upon the defensive means, as well as upon the skill, caliber, and leadership displayed by the defense.

The chances of a successful landing are increased if the enemy is taken by surprise, which is obtained by secrecy of operations, rapidity in the execution of the plans, and the power of the means available. The Command must, therefore, conceal its situation, its material means, its projects, and its preparations. This is the chief reason why all landing attempts are usually made under the cover of fog or darkness, and we know that all the forced landings attempted in daytime during the World War were unsuccessful because the enemy could determine by observation the size of the landing parties, thus allowing him time to dispose of his reserves in a suitable manner.

The modern Coast Defense tactics, as outlined in *Joint Army and Navy Action in Coast Defense*, contemplates not only the defense of fortified harbors, but also the preparation for resisting assaults against unfortified portions of the coast. We believe, however, that if an enemy is going to make a serious invasion of this country, he must either force the fortifications at the entrance of an important harbor, or else try to take possession of this harbor by a land attack. The idea of effecting a landing on a desolate beach, simply because it is not provided with permanent fortifications, seems impracticable. The World War showed that it was possible to transport a large army overseas, in spite of the submarines and mines, but it also showed that the question of supplying this army is one of tremendous importance. On the day of the Armistice, there were reporting to the Commanding General of the Service of Supply 386,000 soldiers, besides 31,000 German prisoners and thousands of civilian laborers furnished by the Allies. At the same time there were 160,000 noncombatant troops in the Zone of the Armies, the majority of whom were keeping in operation the lines of distribution of supplies to the troops at the front. The proportion of noncombatants in the American Army never fell below twenty-eight per cent. In the British Army, it often ran higher. Even when there was greatest pressure of men at the front, the work back of the lines took, roughly, one man out of every three.¹⁰ Taking the case of France as another concrete example, we find that in November, 1918, there were

¹⁰*The War with Germany*, Col. Leonard P. Ayres, Statistics Branch of the General Staff.

1,387,000 men in what might be correctly termed the industrial army, as against 2,845,000 men serving in the combatant army at the front. The production force was, therefore, equal to about one-half the purely military forces.¹¹ It cannot be stated that mechanical elements will entirely displace the human element. Eight men in a tank may deliver fire equivalent to that of a section of fifty men, but the remaining forty-two will be necessary to manufacture spare parts, run the tankdromes, and handle the supplies. Two men operate an airplane, but about twenty men are needed to keep it in operation. It can be seen, therefore, that a strong army must secure a suitable base of operations, and, granting that this statement is correct, we fail to see the wisdom in effecting a landing on a far-away beach unless it be made for a rapid strategic movement against a vital commercial center of the coast. The well known Napoleonic maxim, "a soldier to be worth much must have a full stomach," will always hold true. The question of supplies is of vital importance in modern warfare. We may go a step farther and cite an illustration.

New England is a large industrial center that supplies the country with manufactured goods and is, in turn, supplied by the South, Middle West, and West with the raw products. The Virginia, Ohio, Pennsylvania, and Illinois coal mines supply this important element; the Middle West supplies wheat and corn, while the Great Lakes region contributes the precious iron and copper ores. New England, therefore, constitutes a vital element of the nation and, not being self supporting, it is reasonable to suppose that a powerful and daring enemy, attacking from the Atlantic side, may endeavor to seize an important harbor on the North Atlantic coast in order to establish a convenient base of operations for the purpose of cutting off the New England states from the rest of the country. Our Harbor Defenses can repel a direct attack, and it seems probable that the best chances of success for the adversary would be obtained by turning the harbor defenses, attacking them by land with an army landed on our shores, in which case the main operations would be entrusted to the military forces. An enterprising enemy desiring to seize the harbor of Boston, for example, might well attempt a landing in the vicinity of Plymouth, from where he could strike not only against Boston, but against our naval base at Narragansett Bay. The difficulty of this operation is by no means underestimated, but the success of this enterprise is within the realm of possibility. We have cited this case merely as an illustration. It is obvious, however, that it would prove just as effective to isolate the West and Middle West from the great manufacturing centers of the East and prove the point that we are trying to bring out, namely, that the thorough defense studies of these important strategical areas in times of

¹¹"*L'Organisation de la Nation pour le Temps de Guerre*," by General Serrigny,, French Army.—*Revue de Deux Mondes*, December, 1923.

peace will prove of inestimable value in time of war. The resources of this country are so large that a hostile power must strike quickly and vigorously if it ever hopes to succeed, and, for this reason, we should be ready to respond with even more vigor and act with more rapidity in order to beat him at his own game. Once war has been declared, the offensive is the surest and quickest way of carrying it to a successful end. *The Principle of the Offensive* has always been our basis of training.

THE QUESTION OF RANGE

There is no doubt that at the start, at least, the enemy bombardment will be at long ranges, but even this can be anticipated. Under the terms of the Washington Treaty, battleships are limited in size to 35,000 tons and the caliber of their guns to sixteen inches. A typical treaty battleship will have the following characteristics: Displacement, 35,000 tons; length, 700 feet; breadth, 104 feet; draft, 28 feet; speed, 23 knots per hour; main battery, nine 16-inch guns in triple mounts; secondary battery, twelve 6-inch guns; antiaircraft battery, ten 3-inch guns; armor on conning tower and turret faces, 16 inches; armor on sides, 14 inches.¹² History tells us that the range of naval battles has been steadily increasing. In the early days, the old sea-dog admirals used to say to their gunners: "Don't aim at the masts, aim at the hulls." In the battle of Trafalgar in 1805, the range was 300 yards; the Spanish Fleet of Cervera went down at Santiago in 1898 at 2000 yards; Admiral Togo won the principal naval victory in the war with Russia in 1905, off the coast of Tsushima, at 9000 yards; Von Spee fought Craddock off the Chilean coast at a distance of about 12,000 yards; the battle of Jutland on May 31-June 1, 1916, was fought at an average range of 18,000 yards.

Bombardments at ranges over 30,000 yards can hardly be expected because of the general ineffectiveness of gun fire against land fortifications at such extreme ranges and the restrictions imposed upon battleships by the Limitation of Armaments Treaty as already explained. The United States and Great Britain have the most powerful fleets in the world today; yet the maximum average range of the British fleet is only about 28,600 yards.¹³

The question of accuracy of fire is of such importance that we do not believe that an effective bombardment can at present be carried out at ranges over 20,000 yards, and this statement is based upon the percentage of hits that can be obtained by major-caliber guns at long ranges.

The percentage of hits of the American Fleet at Santiago in 1898 is said to have been 1.4; at Tsushima, the Japanese percentage was claimed to be 3.2; at Jutland, the British Fleet fired 4598 heavy projectiles and the German

¹²*U. S. Naval Institute Proceedings*, April, 1925.

¹³"Another Side of the 5-5-3 Argument," Captain Dudley Knox in the *Scientific American*, Aug., 1925.

Fleet 3597, the percentage of hits being 2.17 and 3.33 respectively. There is every reason to believe that if a naval battle is fought at ranges of over 20,000 yards, a lower percentage may be looked for despite the improvement in fire control methods.¹⁴

AERIAL OBSERVATION

The effectiveness of air observation is a subject in itself, which cannot be discussed at any great length in this article; nevertheless we wish to state that all communication between either plane or ship or between plane and land must be carried on by visual signalling, wireless telegraphy, or radio telephony. The French General Staff published on December 28, 1917, a pamphlet entitled *Instruction on Liaison for Troops of all Arms*, and the Amendments to this work published on February 27, 1919, state that "isolated panels are not visible." Captain Schlessner of the French Army, in an article entitled *L'Aviation de la Cavalerie*,¹⁵ commenting upon the same subject, states: "Even large panels, such as identification panels, for example, may not be seen even by observers who may be on the lookout for them. I do not particularly refer to panels placed on the tops of trees, even those placed on open spaces, or in the middle of large trenches, are practically invisible," General von Hoeppner, the former Commander of the German Air Forces, writes in his book, *Deutschlands Luftstreikräfte im Kriege*,¹⁶ on the subject of Air Reconnaissance during the great struggle: "The observation thus made has, in general, been incomplete and even erroneous in many instances, and care must be taken not to draw too hasty conclusions from them." Frothingham, in his *Naval History of the World War*, quotes from Sir Julian Corbett, referring to the bombardment of March 8, 1915, during the Dardanelles Campaign: "Visibility was bad, spotting from the ships was impossible, the clouds were so low that the seaplanes could not spot the shots." The same author also states: "As to the mobile Turkish guns, the inability of the seaplanes to observe and report during bombardment, proved that the work would be of indefinite duration if proceeded with by ships alone. More obviously than ever were troops required, not only to make good what the fleet had won, but also to give it the eyes it needed." We simply desire to state that air spotting is easy when we have the following conditions: clear weather, calm sea, no radio interference, and when only one ship or battery is firing, thus permitting the aviator aloft to observe and identify the splashes. Needless to say that all these conditions would rarely, if ever, exist at one time. When there are several ships or batteries firing, the problem becomes much more complicated and fire control by aircraft is more difficult. In this case the main difficulty is that the

¹⁴"Gunnery in the Battle of Jutland," H. C. Bywater in *U. S. Naval Institute Proceedings*, September, 1925.

¹⁵Published in *Revue de la Cavalerie*, May-June, 1925.

¹⁶*The German Air Force during the War.*

observer will see too many splashes, or even fail to observe those that are most important. Such inaccurate observation would be of little help, if not actually detrimental to the operations. Our own conclusion is that, all in all, there is no better method of observation for the regulation of artillery fire than terrestrial observation, which is provided with powerful telescopes, carefully oriented, mounted on solid and well-protected bases; and, when handled by competent personnel, preferable to any other whenever circumstances permit.

COAST DEFENSE PROJECTS¹⁷

In our system of Coast Defense, we must also depend upon the Infantry, Cavalry, Air Service, and other combatant branches to repel hostile attacks against unfortified areas. Since our Railway Artillery will form part of the G. H. Q. Reserve, to be used for specific missions only in addition to providing reinforcement for permanent fortifications, the coordination of effort must be made by the Army Commander, by the man who runs and coordinates the movements of the "machine;" but the Coast Artillery is an organic part of this machine and being, perhaps, more vitally interested in the problem of Coast Defense than any other branch of the Service, it is incumbent that it should help in the solution of this project as much as possible by becoming fully acquainted with the coastal areas and having in readiness a plain, clear-cut project of defense, so that it may rank as the leader among other branches should the opportunity present itself. These studies must be made by taking into account the means that are within our reach. Every day we read of the wonderful development in aviation, tanks, long-range guns, infantry weapons, bombs, and chemicals, of the wonderful accomplishments and enterprises that the future is holding in store; however, it will be by far more practicable to plan first with the means already available than with those that may be furnished by a fertile and vivid imagination. A war plan cannot have any practical value, unless it is conceived, not with the means that will be available two or three years after hostilities have commenced, but according to the means that will be available two or three months from the declaration of war. The flexibility of the plan will take care of the war expansion as well as of the introduction of new means of warfare.

Heavy tractor and railway artillery will be the main artillery weapons upon which we must depend for the support of Harbor Defenses and the protection of unfortified areas. The 155-mm. G. P. F. and the railway artillery are the Coast Artillery weapons, and the efficiency of the personnel handling them will be measured by the training and preparation made in time of peace. Peace time is the time allotted for the

¹⁷We use the word project and not plan, because a war plan can only be considered as such, when approved by the proper War Department authorities, in which case it then becomes an actual War Plan.

preparation and drawing up of plans that might be necessary at a future date. A problem badly laid out is usually a problem badly solved. If, on the other hand, we make a careful study of the coast line, determine the probable landing places, decide upon the location of our heavy mobile artillery batteries, both railway and tractor drawn, select observation and command posts, make a survey of communications and road facilities, gather data concerning railway road beds, curves, tunnels, bridges, and other pertinent information necessary for the employment of railway artillery, and, in general, make a careful analysis of the means available and those that may be required in case of emergency, the work in time of war will be greatly simplified. Our latest type of railway artillery, the 14-inch railway gun, model 1920 MII, which fires a 1560-lb. projectile at a range of 45,000 yards, has a track traverse of only seven degrees and it will therefore be necessary to fire this gun from a more or less inexpensive emplacement if we intend, as we do, to use it against moving targets. There are no funds for construction of this nature at present, nor probably for some time to come. Therefore, the best that can be done is to know exactly where we want these emplacements constructed, so that this work can be done without delay as soon as the emergency comes. It requires time, good judgment, and experience to select battery positions, reconnoiter the terrain, and do the necessary orientation work; and if to this we add that this work will have to be done in the face of the enemy, in unavoidable excitement and confusion, and probably by more-or-less inexperienced personnel, we may then be able to realize the enormous advantages of having this work done in time of peace. "In times of peace, studies should be made with a view to the selection of sites for emplacing artillery," we study in our Training Regulations,¹⁸ and, in this connection, the Service Schools at Leavenworth teach that "the probable objective should be determined and plans prepared for an adequate defense of those sections of the coast most liable to be attacked."¹⁹

To make a thorough study of our entire coast line would, indeed, be a vast project which could never be undertaken by the Coast Artillery alone and which may not be so vitally necessary, since we have already discarded the possibilities of landing in distant beaches that lack of strategic importance. The Coast Artillery can, however, undertake this task within a certain reasonable radius of our Harbor Defenses, under the direct supervision of their Commanders, as part of the tactical training of all Coast Artillery districts. Besides serving such useful purpose, it will also be splendid training for officers and men, giving them an opportunity to study the limitations and possibilities of our mobile artillery. The knowledge thus gained will be helpful and serve as an aid in visual-

¹⁸Par. 6, T. R. 435-20, *Emplacement and Tactical Employment of Coast Artillery in Harbor Defense*.

¹⁹*Tactical Principles and Decisions, Defense of Coast Lines*, Chapter XXIV, General Service Schools, Fort Leavenworth, Kansas.

izing our defense problems, developing at the same time a spirit of decision which is one of the most essential qualities of a Commander. The problems outlined in this connection should be simple, the orders should be clear and complete, so that they may have a lasting value, and their aim should be guided by one dominating idea: *simplicity*, which is an everlasting Principle of War. The essential lines of the defense problem must be clear, and around it should be developed the secondary details. "*In Medio Stat Virtus*," and if we desire to derive the full benefit of this work it is essential that we blend an intelligent care of detail with a clear vision of the problem as a whole.

THE PRINCIPLE OF COOPERATION

A very important thing that we must have is a close and harmonious cooperation between the Coast Artillery and the Air Service, as well as between the Army and Navy as a whole. One of the bitter lessons that the Allies received from the World War, at Gallipoli, was the failure to use the Army and the Navy in proper cooperation. The War Department has taken a decided step forward by adopting the policy of having Army officers take up flying duties. The Coast Artilleryman must, by progressive training, learn the problems of the aviator, so that he may be able to visualize and comprehend the difficulties of the airman. On the other hand, it is just as important that the aviator become acquainted with the problems of the Coast Artilleryman, because the artillery cannot deliberately give up its eyes to another service for observation of fire from the air unless those observers have an intelligent and practical knowledge of artillery. This mutual understanding will lead to intelligent cooperation, which is the essence of military discipline. There must exist a general harmonious understanding between these two services for the successful performance of the machine as a whole.

Why should not this cooperation exist? These two branches of our National Defense are intimately related; the Coast Artillery is charged with the anti-aircraft defense, and must also depend upon the Air Service for reconnoitering, location of targets, and regulation of fire in case of long-range firing. In fact, the effectiveness of artillery adjustment, in a great number of cases, will be measured by the training and mutual understanding between the aerial observer and the ground details. These two services have identical missions, for, should our fleet meet with defeat, the responsibility of defending our coastal areas must fall in no small degree upon these two arms.

The Air Service, [says General Pershing in his report as Chief of Staff 1924] has become an essential aid to the Armies in the field, especially because of its ability to obtain valuable information as to the immediate battle front. It is now possible for observers to direct the fire of our artillery from the air,

and thus aviation has risen to very great importance as an auxiliary arm. But satisfactory results cannot be obtained without the closest cooperation with the ground troops. This class of training demands particular attention, not only to perfect personnel and mechanism for accurate observation, but to work out simpler methods of intercommunication and establish more effectively that mutual confidence between ground and air without which attempts at teamwork must certainly fail.

Too much stress cannot be placed upon the importance of the Principle of Cooperation. It is a proven fact that success in war can only be obtained when *all* arms are harmoniously working as a team, each giving its best for the successful achievement of the desired end.

HISTORICAL EXAMPLES: THE DARDANELLES CAMPAIGN

We have already stated that our mission consists of three successive phases: the conception, the preparation, and the execution. The first two phases are problems for the Command upon whom, above all, the result depends, and in this he should be guided by the words of Schlieffen: "When a correct conception is reached, it must be hammered through." One of the first qualities of an organizer is foresight, and it is essential that he should begin preparations early in order not to be rushed. It is unpardonable to be surprised when the emergency presents itself, and we might appropriately state that axiom of the Art of War: *To Command is to Foresee*. The execution depends upon the proper training acquired in time of peace, and this also indirectly depends upon the Command. Successfully to carry out these three phases of our mission, we must turn to the pages of the great book of History and absorb and apply the lessons of the past, adapting them to our present means, because, as Collins says in his *Transformations of War*, "history alone leads us to solid conclusions which nothing can shake, while the essential part of the Art of War is based, above all, on an analysis and comparison of the facts of war, on Military History."

Bearing this in mind, let us briefly discuss the Dardanelles Campaign, which stands out, perhaps, from the Coast Artillery point of view as the greatest naval demonstration and most instructive combined campaign of modern times, so that we may find practical illustrations of the effects produced by the violations of the Principles of War.

It is said that the idea of forcing the Dardanelles was suggested by Russia to the Allies in November, 1914. The Turks were at this time vigorously concentrating their efforts against Russia, and the latter sought to divert the Ottoman pressure by a campaign against the Gallipoli Peninsula, with Constantinople as its objective, which would also serve to re-establish liaison between Russia and the Allies that had been cut off by Turkey's adherence to the cause of the Central Powers. The easy fall of

Liège and Namur had left a deep impression upon the military minds of the contending nations, and the British Admiralty felt sure that the 15-inch guns of the *Queen Elizabeth* would accomplish just as decisive results against the Turkish defenses as the heavy *Feld Haubitze* of the Germans had attained against the Belgian fortresses. "The authorities responsible for the mistaken idea were impressed by the success with which the Germans had reduced the Belgian forts, and concluded that in the same way ship's guns could reduce the Dardanelles forts."²⁰

The forcing of the Strait of Dardanelles could have been accomplished and the duration of the war shortened by perhaps from one to two years if the Allies had not so repeatedly violated the Principles of War and had not committed so many faults in planning and carrying out this project. To realize the importance of this operation, it is sufficient to quote Admiral Tirpitz, who frankly writes in his Memoirs, "Should the Dardanelles fall, then the World War has been decided against us."

A commission of military experts had studied the project and had arrived at the conclusion that a decisive result could only be obtained by a simultaneous attack by land and water, and that a force of 100,000 men were required to occupy the Strait; but, in view of the fact that this force was not then available, the Ministry of the Navy decided to carry out a purely naval attack, giving little thought to the fact that, even if the Fleet had succeeded in forcing the Strait, it could have never been able to hold this advantage without the assistance of a military force. The combined French and English fleet made its first attack on the Dardanelles on November 3, 1914, when the forts at the mouth of the Strait were fired upon. No other demonstrations were made until the month of February of the following year, when the fleet again bombarded the batteries at the entrance, finally succeeding in silencing them after the intensive bombardment of February 25. The operations continued without interruption from this date to the eighteenth of March, on which date took place the great naval action which proved to be the culminating point that caused the Allies to give up the plan of using naval means alone.

If there is any doubt as to the outcome of the attack, had the Allies acted with promptness and energy and according to the well established Principles of War, let us quote from the Official Historical Account of the Dardanelles Campaign, recently published by the Turkish General Staff, which describes the operations from the Turkish point of view:

It would have been perfectly possible to assemble and transport the necessary troops during the one hundred and seven days that elapsed between the declaration of war and the first naval attempt and had this been done, the enemy would, in all probability, have succeeded in forcing the Strait with fewer losses. As a matter of fact, it may be stated that only two Turkish divisions

²⁰*Fifty Years in the Royal Navy*, Sir Percy Scott.

were ready for the land defenses of both sides of the Strait, prior to the twenty-fifth of February and one of these divisions was used for observation and patrol purposes and its units were scattered all over the peninsula. It would have been, therefore, comparatively easy, up to the above mentioned date, to have landed on any part of the peninsula and the capture of the Strait would have been an easy task.

In this campaign, one violation of the Principles of War was closely followed by another. Not only were the Turks not caught by surprise, but no vigor, energy, or combat efficiency was shown by the Allies, especially in the first phases of the campaign. They disregarded that eternal principle: "Victory depends more upon the tenacity and vigor of execution than upon anything else." Let us quote again from the above mentioned Turkish Official Report on the naval action of March 18:

By two o'clock in the afternoon, our situation had become critical. The defenses of Tchanak Kale and Kilid Bahr were under fire, all telephone lines had been cut, communication with the forts had been completely interrupted, some of the guns had been knocked out, others were half buried, others again were out of action with their breech mechanisms jammed. In consequence, our artillery fire had considerably slackened. At this moment, an enemy torpedo boat was sunk in front of Erenkeuei struck by a howitzer shell, and the *Bouvet* went to the bottom having been struck by a mine. At this, the French cruisers fell back and six English cruisers of the second line took their places in combat formation. The *Irresistible* that had advanced from the mouth of the Strait to the Interior, struck a mine and was disabled at 4:30 P. M.; shortly afterwards, the *Ocean*, which was following it, shared the same fate. The *Inflexible*, after having been hit several times, was compelled to fall back at this same moment; the *Agamemnon* had been struck also by our projectiles several times. It was evident that the entire fleet had suffered a reverse. It left the Strait abandoning the *Irresistible* and the *Ocean*, which could not be moved and sunk in the darkness of the night. After this costly operation, the enemy gave up the idea of a purely naval attack and never again entered the Strait.

The results of this naval attack, which lasted seven hours and in which sixteen battleships and many cruisers and torpedo boats participated, may be briefly summarized as follows: Allied losses: three battleships,—the *Bouvet*, *Irresistible* and *Ocean*,—were sunk and three other battleships,—*Inflexible*, *Suffren* and *Galois*,—suffered such serious damages that they had to be docked and repaired before they could render further service, while the *Charlemagne*, *Agamemnon*, *Lord Nelson*, and *Albion* were also damaged and some of their guns put out of action by the fire of the fortifications. The defense losses, as given by the Turks, were four officers and forty soldiers killed or wounded, eight guns damaged, some ammunition depots and barracks destroyed, while the forts of Tchanak Kale and Kilid Bahr were partly destroyed by the fire of the Fleet.

The defeat of March 18 convinced the British Admiralty of the utter impossibility of forcing the Strait by purely naval means, and it was then

decided to attack the Strait by both land and water, but instead of striking rapidly and secretly, the Allies waited over a month, and their efforts were so poorly concealed that the Turks were well conversant with their intentions and even knew the approximate force that was to be employed in the operations. The Turkish Official Account thus states: "The Turkish General Staff learned after the battle of March 18 that the Allies had decided to force the Dardanelles by land, and with this end in view had begun to concentrate in the islands of Imbros and Lemnos, located at the entrance of the Strait, a force of 40,000 French and 50,000 English soldiers." The first landing attempts took place on April 25, and it hardly seems necessary to enumerate herein the heroic efforts made by the troops in the Ari Burnu, Sedd el Bahr and Kum Kale sectors, where the landings had to be made in the face of concealed wire entanglements and machine-gun nests strategically located by a well-prepared enemy, nor the operations that dragged along until the tenth of January, 1916, when the project was finally abandoned and the troops reembarked.

The main factor responsible for checking the Allied Fleet on March 18, besides the bravery of the Turkish soldier, was the planting of mines at Karalyuk Bay, but the Allies should have foreseen that the Turks had reorganized these mine fields utilizing all the means at their disposal, and should have cleared the Strait before entering it. Immediately after the disaster of March 18, Admiral de Robeck reported to the Admiralty: "Squadron is ready for immediate action, except as regards ships lost and damaged, but it is necessary to reconsider the plan of attack. A method of dealing with floating mines must be found." These steps should have been anticipated, and by failing to do so, the Allies overlooked that sterling quality which an efficient commander must possess, *foresight*. To command is to foresee, we have stated, and nowhere else do we find a better illustration of this military axiom than in the Dardanelles Campaign.

Another important lesson, derived from the Dardanelles Campaign, is the distinct superiority of the fire effect of fortifications over the fire delivered by ships. On March 5, the *Queen Elizabeth*, armed with 15-inch guns, attempted to reduce the inner defenses of the Strait, but its failure was soon apparent to all. Admiral Carden, referring to the attack of February 19, explains the failure to silence the forts in the following manner: "The result of the day's action on the nineteenth of February showed apparently that the effect of long range bombardment by direct fire on modern earthworks is slight."

We have seen in this campaign, that an attempt by naval means alone has practically no chances of success, and that a combined attack must be well prepared and promptly and aggressively carried out. The Principle of Economy of Force cannot be violated by effecting numerous landings, while cooperation between the land and naval forces is absolutely essen-

tial. The Allies violated the Principles of War and had to pay the price. The much-heralded expedition, which could materially have shortened the duration of the war and brought glory upon the Allied Command, ended in a dismal failure.

CONCLUSION

In conclusion, we wish to state that History gives many striking illustrations which show the value and importance placed upon the study of the Art of War by the great military leaders of all ages and of all countries. We find, for instance, in the book entitled, *The Military Art in Ancient China*, which contains the works of the Chinese Generals of the first and second centuries, B. C., much wise advice. General Se-Mu tells us: "Instruct the troops in detail, tell them a hundred times, repeat without ceasing what they should do and what they should avoid." "The Art of War," says Washington, "is at once comprehensive and complicated. It demands much previous study, and the possession of it in its most improved and perfect state is always a great moment to the security of a nation."²² Napoleon was a firm believer in the Principles of War. He wrote: "Read and re-read the campaigns of Alexander, Hannibal, Gustavus Adolphus, Turenne, Eugene of Savoy, and Frederick the Great. Model yourself on them. This is the only means of becoming a great captain and of discovering the secrets of the Art of War." And, writes Colonel Henderson in his work on Stonewall Jackson, "if Napoleon himself, more highly endowed than any other general of the Christian era, thought it necessary to teach himself this business by incessant study, how much more is such study necessary for ordinary men?"²³ Marshal Foch, for whom such great admiration is felt all over the world, tells us that "although the History of War is no substitute for actual experience, it can be the foundation for such experience. In peace time, it becomes the true method of learning the invariable principles of the Art of War."²⁴ These principles apply to the Coast Artillery, as well as to the Infantry, or any other branch of the Service, and they hold as good today as they did hundreds of years ago. There is, indeed, no better method of determining how our mission can best be accomplished than by a study of the progressive course that the Art of War has followed in the past. We may summarize the situation with the words of President Coolidge, which are applicable to any situation: "Great light is always shed on what ought to be done, by finding out what has been done."

²²George Washington, December 7, 1776.

²³Stonewall Jackson and the American Civil War, Henderson.

²⁴Principes de l'Art de la Guerre, Foch.

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Naval Guns versus Shore Defenses

By

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NAPOLEON is credited with having said, "*Un canon sur terre vaut dix sur mer.*" Lord Fisher, in a memorandum to the Prime Minister, January 25, 1915, stated that, "The sole justification of coastal bombardments and attacks by the fleet on fortified places . . . is to force a decision at sea, and so far and no further can they be justified."

In our own service there is an axiom frequently employed in estimates of the situation, which is to the effect that history shows that bombardment of shore fortifications by ships is seldom successful. Nevertheless, various assertions made by officers of the attacking forces during the critique which followed the recent joint Army and Navy exercises in the Pacific gave the impression that a value, not justified by past events, is sometimes accorded the fire of naval guns against shore defenses.

The outstanding example of this type of operation is the attempt and failure of the Allied Fleet to force the Dardanelles, and an endeavor has been made in the following article to collect from the works of various writers of note salient facts bearing on the effect of the naval bombardment of the Dardanelles defenses, and to present them in a more compact and connected form than that in which they may be found in a history which covers the entire Dardanelles campaign.

The principle sources of material are: "Naval Operations," from *The Official History of the War*, by Sir Julian S. Corbett; *From Berlin to Bagdad*, by Mr. George Abel Schreiner, the American war correspondent who was present at the Narrows during all of the major attacks on the inner defenses; *The Dardanelles Campaign*, by Henry W. Nevins; and *Notes on the Dardanelles Campaign of 1915*, by Major Sherman Miles, U. S. Army, printed in the COAST ARTILLERY JOURNAL.

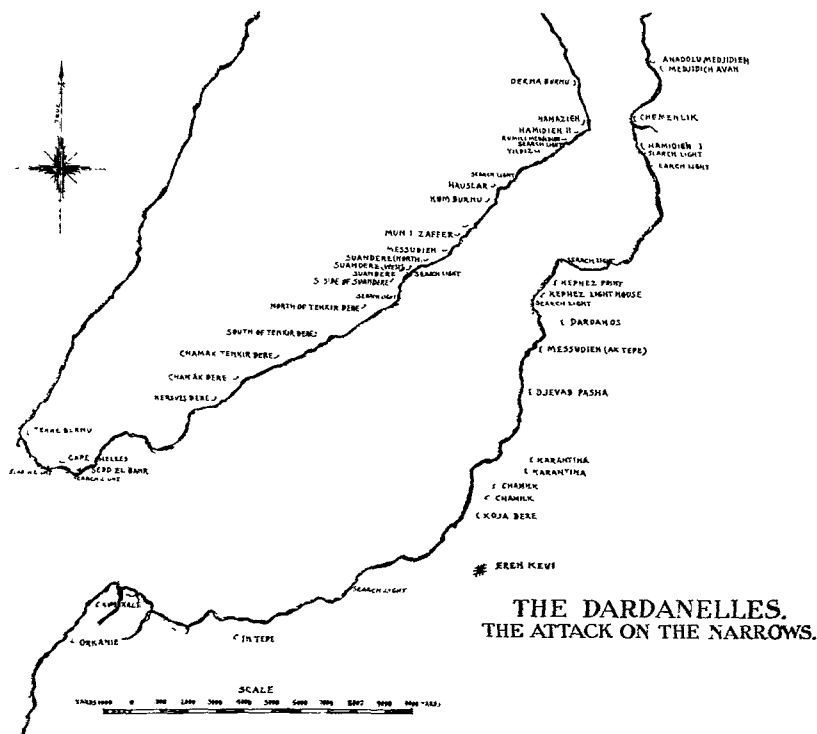
An earnest attempt has been made to present the facts as nearly as possible just as they are given by their authors and in much of this article the words of the reference work are closely followed, often being quoted exactly.

The general plan of attack consisted of the following phases:

1. Reduction of the Outer Defenses.
2. Reduction of the Intermediate Defenses and sweeping of the lower lines of mines.
3. Reduction of the Inner Defenses.
4. Sweeping of the mine fields in the Narrows.

The general plan for dealing with the forts, as given in the *Official Naval History*, was, "first, a long-range bombardment (direct or indirect) out of range or bearing of the enemy's guns; secondly, a bombardment at medium ranges using secondary armament and direct fire; and thirdly, the final reduction of the forts by an overwhelming fire at decisive ranges of from 3000 to 4000 yards.

Since the fourth phase was never attempted this article will deal only with the first three phases.



THE ATTACK ON THE OUTER DEFENSES

According to Major Miles, "The outer defenses consisted of three groups of batteries (12 heavy and four light guns in all) on the southern end of the Peninsula, and two groups of batteries (nine heavy and two medium guns in all) on the Asiatic shore opposite. Of these guns, but four were modern."

There were four main forts and one howitzer battery. This was at Tekke Burnu on the European side and consisted of four 4.7-inch howitzers. The main fortifications on the European side was Fort Sedd el Bahr, a low-lying, comparatively modern work, constructed of earth and mount-

ing two 11-inch, two 10.2-inch, two 9.4-inch, and four 3.4-inch guns. Supporting Sedd el Bahr was Fort Helles, about 100 feet above sea level on the cape of the same name. Here were two 9.4-inch guns. On the Asiatic side the main fort was Kum Kale, consisting of two circular bastions with a low curtain between them and mounting two 11-inch, two 10.2-inch, two 9.4-inch, one 8.2-inch, and two 5.9-inch guns. A mile down the coast to the southwest was its supporting battery, Orkanie, 125 feet above sea level and armed with two 9.4-inch guns.

According to the plan Sedd el Bahr was to be bombarded by the *Inflexible*, and Helles by the *Triumph*, the latter using indirect fire with the *Inflexible* spotting. Kum Kale would be attacked by the *Suffren*, by indirect fire at from 9,000 to 10,000 yards, from a position where she would be out of the arc of fire of both Asiatic forts. The *Bouvet* was to spot for her from a point about five miles west of Cape Helles. Orkanie would be attended to by the *Cornwallis* using direct fire.

The *Cornwallis* began the engagement at 9:51 A. M., February 19, when she opened fire on Orkanie. Ten minutes later the *Triumph* began bombarding Helles with her ten-inch guns at 7700 yards, and by 10:32 A. M. the *Suffren* was engaging Kum Kale. Since the ships were out of range of the forts there was no reply, and in order to improve the fire all ships were ordered to anchor. The *Cornwallis*, having capstan trouble, was unable to anchor in deep water and was relieved by the *Vengeance*. The *Inflexible* tried two rounds on Helles at 15,000 yards, but finding it difficult to spot at this range, she weighed and moved 2500 yards nearer in. She continued to engage Helles, apparently with good results, until 1:00 P. M., when she shifted to Sedd el Bahr, the *Gaulois* spotting her sixth shot as a hit. The *Triumph* was not so successful with her indirect bombardment of Helles. She fired only fourteen rounds from 10:00 A. M. to 12:15 P. M. and, not having hit the fort, she was ordered to cease fire. The *Suffren* however, having anchored 11,800 yards from Kum Kale, and firing indirectly, seemed to be doing excellent work, and the *Vengeance*, having relieved the *Cornwallis*, was apparently having equal success with Orkanie by direct fire. However at noon a seaplane reported all guns in Sedd el Bahr, Orkanie, and Kum Kale intact.

At about 3:00 P. M. the ships moved in to close the range. The *Suffren* was ordered to bombard Kum Kale by direct fire with secondary armament at 7000 yards, making short runs at decreasing ranges, and to take on Orkanie later at 5000 yards, assisted by the *Vengeance*. The *Bouvet* and the *Inflexible* were to deal with the European forts in similar fashion and to complete the destruction at close range.

The *Suffren* carried on as directed, making three runs, and maintaining a deliberate fire on Kum Kale. There being no reply she closed to decisive range at 4:10 P. M. and opened a rapid fire. The *Vengeance*, too,

was plunging shells into the fort, which appeared to be ruined, and at the same time the *Vengeance* and the *Cornwallis* were using their secondary armament on Orkanie and Helles respectively. The forts seemed completely overwhelmed and the *Vengeance* was ordered to cease fire and close in to examine them. She was standing in to carry out her instructions when suddenly both Orkanie and Helles opened a hot fire on her as though they had not been touched. She immediately engaged Helles, while the *Bouvet*, *Suffren*, *Gaulois*, *Inflexible*, and *Agamemnon* joined in the bombardment. The ships ceased firing at five-thirty, at which time Helles was silent but Orkanie was still firing.

According to Sir Julian Corbett:

* * * the unexpected activity of Forts Helles and Orkanie at the close of the day had shown, in the Admiral's opinion, that the effect of long-range bombardment of modern earthworks was slight. They appeared to have been hit by a number of well-placed 12" common shell, but when the critical moment came all the heavy guns which these forts contained were in action. It began to be clear, in fact, that nothing short of a direct hit would knock out a gun, and that the necessary accuracy for a direct hit—particularly when ammunition had to be husbanded—could not be obtained by indirect fire, and was scarcely to be hoped for by direct fire unless the ships were anchored.

The Turkish casualties were reported to be one officer and a few men killed on the European side and one officer and two men at Orkanie.

On account of bad weather the bombardment could not be resumed until February 25 when it was planned to complete the destruction of the outer forts at close range, the general plan being that four ships working in pairs should run up to the jaws of the Straits and back, engaging Helles and Orkanie with their secondary armament until the range was down to 3000 yards. The *Vengeance* and the *Cornwallis* were to make the first run, the *Suffren* and the *Charlemagne* the second, while in support the *Agamemnon*, *Queen Elizabeth*, *Irresistible*, and *Gaulois* would anchor and take under deliberate long-range fire all forts on both sides of the Straits.

It was soon evident that Helles was far from being destroyed. Both of its 9.4-inch guns were being worked with great skill, and the *Agamemnon*, being hit seven times in ten minutes by armor-piercing shell, was forced to weigh anchor. The fort then shifted to the *Gaulois* and quickly straddled her, but the ship opened a rapid fire with every gun that would bear and was able to slip and move further out. The *Queen Elizabeth* now directed her attention to Helles and got direct fifteen-inch hits with her sixteenth and seventeenth shots. She was then joined by the *Agamemnon* and between them they put both guns of the battery out of action.

All this time the *Gaulois*, anchored, had been engaging Kum Kale, while the *Irresistible*, firing on Orkanie, had kept that battery silent. None of the forts was firing by noon and at 12:15 P. M. the signal was made for

the *Vengeance* and the *Cornwallis* to prepare for the first run in. The *Vengeance* led with the *Cornwallis* 1000 yards astern. Just before one o'clock they began to fire on Orkanie and Helles. In ten minutes, having advanced to within 4000 yards of Kum Kale, the *Vengeance* circled to port 16 points, the *Cornwallis* carrying on for three minutes and making a wider circle. Sedd el Bahr fired only four rounds in return; and one gun from Kum Kale, another from near Helles, one from Orkanie, and some field guns also fired on the *Cornwallis*. The run was completed at 1:22 P. M., both ships having secured hits on Helles and Orkanie. The covering ships then checked fire.

The two French ships made their run a little to the north of the first, and it was carried in closer. They were ordered to concentrate on Sedd el Bahr, Orkanie, and Kum Kale, but especially on Orkanie. It began at 2:10 P. M. at 12 knots. The *Suffren* began firing on Orkanie at about 9000 yards and kept it up for a quarter of an hour, when she shifted to Kum Kale, keeping on this target until the range was down to 3000 yards. She then began the turn to port and bombarded Sedd el Bahr for six minutes. The *Charlemagne* followed her leader's example but, making a flatter turn, was able to keep on Kum Kale longer. The only reply was a single shot from Kum Kale.

Just after 3:00 P. M. the Admiral ordered the *Albion* and *Triumph* to close the forts and destroy any remaining guns. They opened a heavy fire with their secondary armaments and one shot from Orkanie was fired at the *Albion*. She, with the *Agamemnon* and the *Irresistible* at once attacked it and it did not fire again. Helles and Kum Kale also fired one round each.

So just a week from the start the first phase of the operations seemed well in hand and the outlook was considered promising.

It is interesting to note that when demolition parties were landed the following day it was found that while both guns at Orkanie were out of action, at Sedd el Bahr four of the six heavy guns which the fort contained were found to be undamaged. And on March 1 a second demolition party found that at Kum Kale, in spite of the bombardment, seven of the nine guns it contained were entirely untouched, and only one of them was unserviceable. It was later learned that Helles had been put completely out of action by the *Queen Elizabeth* during the bombardment of February 25.

CONCLUSIONS

The four forts were armed with a total of twenty-three guns as follows: four 11-inch, four 10.2-inch, eight 9.4-inch, one 8.2-inch, two 5.9-inch, and four 3.4-inch. Of these guns, according to Major Miles, "but four were modern."

The twelve battleships which actually had a part in the bombardment were armed with 192 guns as follows: eight 15-inch, forty-two 12-inch, two 10.8-inch, four 10-inch, ten 9.2-inch, fourteen 7.5-inch, ten 6.4-inch, sixty 6-inch, and sixteen 4-inch.

The forts were bombarded intensively for two days. Much of the firing was done from ships at anchor. Some was indirect and from areas where no reply from the forts was possible. Conditions for the firing ships were ideal. They could choose their own range and remain out of reach of the forts whose extreme range was found to be 12,500 yards. They were unmolested by enemy naval forces and had no opposition except from the forts themselves.

The actual results accomplished are astonishing. Two guns in Orkanie, two in Helles, two in Sedd el Bahr, and one in Kum Kale were put out of action by fire from the ships. The bombardment then put out of action only seven, or thirty per cent, of the twenty-three guns in the forts.

That demolition parties were able to land and destroy the remaining guns was not because of damage inflicted or casualties received, but because the untried Turkish troops were demoralized by the ships' fire. This however was a temporary condition which the Allies were not to encounter again for, according to Sir Julian Corbett, by March 4:

The Germans had had time to whip the Turks into facing the ships, and they had met with a distinct success, which lent itself to being worked up into an inspiring victory. The moral effect could not fail to be serious, and it was becoming more evident that without a strong force of troops, there was little likelihood of the fleet being able to do even the preliminary work of forcing the Straits.

THE ATTACK ON THE INTERMEDIATE DEFENSES

According to Major Miles:

The intermediate defenses consisted of batteries on both shores, from a point three miles inside the Straits to two miles below the Narrows. On the European shore there were 14 batteries, mounting 10 heavy howitzers, 22 medium howitzers and mortars, 15 medium guns, and 21 light guns and howitzers. On the Asiatic side there were 13 batteries, mounting eight heavy howitzers and mortars, eight medium guns, 16 medium howitzers, and 24 light guns.

The largest guns were eighteen 8.2-inch howitzers, ten on the European side and eight on the Asiatic. The remaining guns were from 5.9-inch to 1.8-inch, a considerable number being naval and field guns. Twenty-three of the batteries had been installed since the declaration of war in November. They were in hastily constructed emplacements and many of them were mobile batteries.

There were only two forts included in the intermediate defenses—Dardanos on the Asiatic side and Messudieh on the European. Dardanos,

about three hundred feet above sea level, was armed with five 5.9-inch guns, three of them naval guns taken from the wrecked guardship *Messudieh*. There were five subordinate batteries in the Dardanos group, all of which had been completed since the first bombardment, and which were armed with thirty-two light naval quick-firing and Hotchkiss guns and field guns. *Messudieh*, on the European side opposite Dardanos, was armed with three naval 5.9-inch guns and supported by seven minor batteries, armed with thirty-three field and light naval guns. The sixty-five guns in these two groups were designed as a special defense for the mine fields. The remaining fifty-nine guns of the intermediate defenses, most of which were howitzers and mortars, many mobile, had a different function. In addition to harassing ships in the Straits, the duty was to set up a barrage fire on defined areas, so as to force ships to keep moving, thus interfering with any attempts to bombard the inner defenses.

The general plan of attack was for one battleship, preceded and followed by mine sweepers, to move up each side of the Straits and, as directed by the operation order, to "destroy the land defenses on both sides as far up as Kephez Point, mutually supporting each other. They will carry howitzers for use against enemy field guns, and must not approach within range of the forts at the Narrows. Seaplanes will assist them."

The *Albion* and the *Majestic* made the first run in, the former taking the north shore, the latter the opposite side. Shortly before noon, February 26, the *Albion* opened on Fort Dardanos with her 12-inch guns at 12,000 yards. The *Majestic* soon joined in at extreme range and also engaged a field battery on the Asiatic side. The ships held on, firing deliberately on Dardanos which did not reply, but at about three o'clock the ships came under fire from howitzers and field guns which neither they nor the airmen could locate. The range was short and they became very troublesome. "It was, in fact," says Sir Julian Corbett, "our first experience of a difficulty which though not entirely unexpected, was destined to develop a serious power of interference and to prove one of the most formidable obstacles to success." The two ships found that only by constantly keeping in motion could they avoid serious injury, and even then the *Majestic* had been hit below the waterline and was leaking when they were recalled at 4:00 P. M.

A gale the following day, February 27, made operations inside the Straits impossible, and the weather was still bad on the twenty-eighth. However, March 1, the *Albion* and the *Triumph* were sent in to engage Dardanos, with the *Ocean* and the *Majestic* looking after the mobile guns. As the *Ocean* and *Majestic* moved in they came under fire from two field batteries which they silenced, only to have howitzers open on them from the vicinity of Eren Keui. The *Irresistible* came to their assistance and the three ships silenced the fire of the Asiatic batteries, only to encounter

a galling fire from concealed guns on the European side. Meanwhile the *Albion* and *Triumph* were proceeding, but before they could get in position they were attacked by batteries on the European side whose fire was so accurate that the ships had to begin circling to avoid it. Since effective fire on Dardanos could not be maintained under the circumstances, both ships took on the troublesome batteries with temporary success. However, although the *Majestic* moved up until she could use her howitzers—she had one on each turret—the fire from the shores could not be kept down and after completing two circles the ships were recalled.

The operation was continued on March 2 with a changed plan. It had been discovered that close in along the European shore there was dead water for guns on that side up to 7000 yards from Fort Dardanos, and that a ship close in to the shore was out of range of the Eren Keui batteries. Accordingly the *Canopus*, supported by the *Swiftsure*, was ordered to take this line, while the *Cornwallis* devoted her attention to minor batteries and howitzers on the Asiatic side.

The *Canopus* and *Swiftsure* went in at about 1:30 P. M. and advanced along the north shore to the limit of the dead water, where they stopped and began a deliberate fire on Dardanos at 7500 yards. A small field-gun battery close at hand caused some annoyance, and howitzers above Messudieh opened on them whenever they left the dead water. However they kept up a deliberate fire on Dardanos for nearly two hours without reply. But at 4:15 P. M. the fort suddenly opened in earnest and immediately began straddling the ships. The *Canopus* was hit several times and the two ships fell back to a position further out in the Straits. Here they came into the fire area of Eren Keui, which the *Cornwallis* was bombarding, and found themselves under a heavy fire from Dardanos and from the howitzers on both sides. They concentrated on Dardanos and the fort soon ceased firing. The *Swiftsure* then assisted the *Cornwallis* in silencing the Eren Keui area, and, further bombardment of Dardanos failing to bring a reply, the ships were withdrawn.

It was believed that much damage had been done to Dardanos, but later information showed that the fort had suffered little. The mobile guns and howitzers had done a good deal of minor damage to the ships and appeared to have suffered little themselves. The mine-field defense was still intact and no progress could be made in sweeping operations.

The following day, March 3, the weather was again bad and during the forenoon no further attack on the intermediate defenses was made, other than a desultory bombardment of the Eren Keui area by the *Albion*, *Triumph*, and *Prince George*. Later in the day, however, the visibility improved and the *Prince George* was ordered to advance along the European shore and attack Dardanos. She made four runs without eliciting a reply from the fort, but during the fourth, having left the dead water,

she came under a heavy fire from howitzers and from Messudieh, and was recalled. This ended the second phase as a separate operation.

CONCLUSIONS

The attack on the intermediate defenses was an unqualified failure. The ships suffered some damage and accomplished nothing. According to reliable Turkish reports the batteries engaged between February 26 and March 4 sustained no damage beyond a few casualties to personnel. Far from having cleared the way for attempting the third phase, the Allies were forced to accept, as an additional hazard in their next operation, the undamaged defenses of the intermediate area.

THE ATTACK ON THE INNER DEFENSES

Major Miles states:

The inner defenses consisted of batteries grouped on both sides of the Narrows. On the European shore there were five battery groups, mounting 30 heavy guns (including two 14-inch), six medium guns and three medium howitzers. On the Asiatic side there were six battery groups, mounting 31 heavy guns (including four 14-inch), six heavy mortars, eight medium guns and four medium howitzers. The inner * * * defenses had been installed before the war, and were mostly old pieces.

Sir Julian Corbett says:

The inner and main defenses, which were now to be the immediate objective, consisted of five main forts closely grouped on either side of the actual Narrows. All were low-lying, on a system which had become discredited, but most of them had been remodeled and to some extent re-armed in the past ten years. In the Kilid Bahr group, on the European side, were three. Of these the nearest was Fort Rumili Medjidieh (No. 13), armed with two old 11" and four modern 9.4" guns. Facing down the Straits and imperfectly traversed it was liable to enfilade from the west and southwest. Next to it, but higher up the hillside, came Fort Hamidieh II (No. 16), a more modern work, armed with two modern 14" guns. It also faced down the Straits and was liable to enfilade from the westward. Immediately beyond it was the principal fort, Namazieh (No. 17), adjoining the ancient castle of Kilid Bahr. It was a large, wedge-shaped work, with its salient upon a projecting point of the coast, and was armed with sixteen guns (exclusive of howitzers), most of them of old type. On the southern face, looking down the Straits, were five 9.4", all but two of old type. At the salient were three old 8.2", and the rest of the guns—that is, six more old 9.4," and two heavier guns (10" and 11")—were on the eastern face looking across the channel.

The most formidable battery of all was on the other side, in the Chanak group. This was Hamidieh I (No. 19), a solid, well-traversed work close on the beach and facing directly down the Straits, with two modern 14" guns ranging to 17,000 yards and seven 9.4" ranging to 15,000. It was, moreover, well furnished with new range-finders and equipment, and was manned, the Turks say, entirely by Germans. About 1,000 yards to the north of it, on the point opposite Namazieh and adjoining Chanak town, was Chemenlik (No. 20),

a conspicuous earthwork clearly marked by the old keep of Chemenlik castle, which remained enclosed within its ramparts. It had but one modern 9.4" and an older 8.2" upon its southern front, and looking across the Straits it had two 14", one of which was of long range, with an arc of fire from southwest to northwest. Besides these main batteries both groups had in or near them howitzers, field guns and Nordenfeldts.

Mr. Schreiner, who was present at the Narrows during the attacks, says of Chemenlik: "The fort has four cannon of ancient vintage and large bore — 35.5 centimeters"; and of Hamidieh I:



TURKISH BATTERY AT KALID BAHR

It is a more modern affair than its sister battery. The fort, if one may call it that, has twelve emplacements. Four of the guns, 35.5 cms., are of fairly modern origin; eight others are of about the same age.

The emplacements are protected by an earth parapet with earth traverses. Of turrets and such there is not a trace to be seen. That, I understand, is the state of affairs generally along the Dardanelles, with the exception of a battery on the site of the ancient city of Dardanos — five 15-cm. pieces in half turrets.

I cannot say that the equipment of the Turks impressed me in the least. The guns are outclassed in range and lack many of the contrivances used nowadays to make artillery fire accurate and effective. The sights I inspected are poor, the electric communication system in the batteries and to points beyond is exposed to shells, being strung on poles in the most haphazard manner.

How the Turks and Germans hope to keep away, with guns of a maximum range of 14,500 meters, ships that have a maximum range of at least 18,000 meters, is more than I can understand. I discussed that with some of the officers and found that they shared my views.

The inner defenses were armed with a total of eighty-eight guns and howitzers, most of them of old type. However, as the ships had entirely

failed to destroy the intermediate defenses, these guns (124) must be included in the total armament opposing the Allied Fleet, and events proved that these latter guns, together with the mine fields which they defended so effectively, were largely instrumental in the failure of the Allies to force the Straits.

The attack on the inner defenses began on March 5. The orders for attacking had been worked out in detail, the idea being for the *Queen Elizabeth* to anchor in the Aegean on the west side of the Peninsula and to fire over the Peninsula at the Narrows forts. As the range would be about seven and a quarter miles good spotting was essential. Seaplanes were to be used, but, as they were not too efficient, the chief reliance had to be placed on ships within the Straits. Owing to the failure of the attempts to dominate the guns and howitzers of the intermediate area, no spotting ship could anchor. They would have to keep moving and it was therefore necessary to detail no less than three battleships for the work. The ships selected were the *Cornwallis*, *Irresistible*, and *Canopus*. They were to run up the Straits in succession at twelve-minute intervals, ready to fire on Messudieh, Dardanos, and other batteries should they show activity. The spotting was to be done at a distance of from seven to eight miles. As the firing was across the line of observation, range could be fairly well controlled, but deflection was mere guesswork.

It was not until noon that the *Queen Elizabeth* was able to fire her first shot. Owing to accidents no seaplanes were available. One had engine trouble and crashed into the sea. The pilot of the second was wounded and had to return. Moreover the spotting ships in the Straits were having difficulties as all of them were exposed the whole time to fire from shore guns which they had the greatest difficulty in locating. None of them was touched, but the *Queen Elizabeth*, although protected by the *Prince George* and *Inflexible*, was hit seventeen times by mobile guns. The *Queen Elizabeth* continued firing until the light was so bad that further firing was useless, having expended about thirty-five 15-inch shells.

Mr. Schreiner, who observed this day's bombardment from close at hand, says that the Narrows forts were also fired on by ships in the Straits and that—

at about 3:45 an Allied hydroplane hove into view above Kilid Bahr. The observer was to report on the damage done. What he reported I don't know, of course. I hope he told the truth—that the effect so far had been nil, as it was. * * * The German artillery experts held the view that the ammunition used by the Allies was not suited for the work in hand. The shells were made to do their best in armor penetration. But there is no armor worth mention along the Dardanelles. The parapets and traverses are of sand. * * * Shells that would go through steel armor as through a piece of cheese are nearly worthless against the sand protecting the emplacements.

Reliable Turkish reports stated that Rumili fort was struck eleven times but no gun was put out of action. Namazieh was hit six times. This indirect bombardment had a great moral effect on the guns' crews.

It was apparent to the Admiral that the system of spotting by a succession of ships on the move with a constant change of spotting officers would never do. A single ship must be used, and the following day, March 6, the *Albion* was chosen, with orders to take position in the comparatively dead water on the European side, covered by the *Majestic*, *Prince George*, and *Vengeance*. The covering ships were also to keep an eye on Dardanos and Messudieh.

The target on this occasion was to be Fort Chemenlik on the Asiatic side. The results were even less favorable than on the previous day. Operations began late, visibility was not good, and the spotting met with every kind of an interruption. The spotting division met with a rapidly developing howitzer fire which kept the *Albion* on the move and forced the covering ships to engage the shore batteries. Moreover as soon as the *Queen Elizabeth* anchored heavy shells from hidden howitzers began to fall so close that she had to shift one thousand yards out. Here by 12:30 P. M., at the extreme range of her three-quarter charges, she was able to begin; but the inside squadron was in difficulties and the *Albion's* spotting corrections were long in reaching her. The *Albion* was constantly harassed by the fire from hidden howitzers and in an hour and a quarter the *Queen Elizabeth* got off only five rounds. During this time another howitzer battery had got her range and she had to shift three thousand yards to the westward, bringing the range to over 20,000 yards. Here at 3:30 P. M. she began again with full charges, but got off only two rounds before being ordered to cease firing on account of bad light.

The ships inside the Straits now closed Fort Rumili to 12,000 or 13,000 yards and attempted to destroy it but were unable to see what damage was done. They came under a fairly heavy fire and suffered a few hits.

A Turkish report states that the Kilid Bahr forts were hit five times during the day.

Of this day's bombardment Mr. Schreiner says, "The effect of the bombardment was nil again."

He also makes a statement which may account for the reported howitzer fire which caused the *Queen Elizabeth* to shift anchorage on two occasions.

In the afternoon we had the most unusual, indeed unique, spectacle of seeing battleships bombard one another by indirect aim.

During the night the Turks had brought into the Central Strait the line ships *Haïreddin Barbaruss* and *Torgut Reiss*. The purpose of this move was to

make it interesting for the Allied line ships which have been bombarding the works at Kilid Bahr from across the Peninsula. It is reported that one of the line ships, allegedly the *Bouvet*, was hit.

The work on March 6 had been thoroughly unsatisfactory and had demonstrated the hopelessness of an indirect long-range bombardment with such wholly inadequate means of spotting. However Admiral Guépratte, during a reconnaissance, had been able to locate several of the troublesome howitzer batteries and it was decided that, on March 7, the two sister ships, *Agamemnon* and *Lord Nelson*, should make another attack on the Narrows under cover of the French Division. The first objective was to be Rumili, the second Hamidieh I.

The French Division went in first; shortly after noon the two British ships passed them, keeping a mile from the north shore, and at about 12:30 P. M. engaged Rumili with their forward guns at 14,000 yards. Continuing this till the range was down to 12,000 yards the *Agamemnon* led across the Straits and brought her broadside to bear. She quickly ran into a hail of projectiles from batteries and concealed guns on both sides, all of which the French Division hotly engaged. Then at 12:45 P. M. Rumili opened up with well-concentrated salvos of four 9.4-inch guns as though it had never been touched. Five minutes later the Germans in Hamidieh I began for the first time.

Both ships were firing broadsides from their 12-inch and 9.2-inch turrets and both were hit several times, the *Agamemnon* getting what seemed to be a 14-inch shell on her quarter deck which did much damage. By 2:00 P. M. the fire of both forts was obviously slackening and it was believed that much damage had been done to them.

Besides damage from field guns and howitzers the *Agamemnon* had been hit eight times by heavy shell and the *Lord Nelson* seven times, one being below her waterline which caused two bunkers to fill. The incessant fire of the French Division on the innumerable howitzers and field guns on both sides of the Straits materially reduced this annoyance.

According to Schreiner "the fire of the Allies was good but not effective. * * * The damage done was small, ridiculously small. Not a single gun had been damaged.

The British were none too sanguine as to the damage suffered by the forts for, as Sir Julian Corbett says:

It was obvious that the periodical silence of the forts meant, not that they had been put out of action, but that the gunners took shelter ready to return to the guns as occasion offered. Heavier shell was required to wreck the forts, and Admiral Carden, putting aside all hesitation about using the *Queen Elizabeth* inside, ordered her to conduct a direct bombardment next day (March 8).

But on account of bad visibility and low clouds which made sea-plane spotting impossible, the *Queen Elizabeth* fired only eleven rounds, only one of which seemed to be a hit.

The Turks stated that on March 7 and 8 no damage of military importance was done and there were no casualties. The batteries only ceased fire to keep their ammunition for lower ranges or when compelled to clear their guns from grit and debris thrown up by exploding shells. They could have continued in action had they so desired.

Between March 8 and March 18 no further attempt to bombard the inner defenses was made. Instead, numerous night sweeping operations were undertaken with the object of clearing the mine fields so that the ships could close to decisive ranges. These met with little success and considerable loss, and the covering ships were quite unable to destroy the searchlights which invariably disclosed the sweeping vessels to the shore batteries.

March 18 was the date of the greatest and the final attack on the Narrows' forts. The general plan, according to Sir Julian Corbett, "was to silence the defenses of the Narrows and of the mine fields simultaneously."

The scheme of attack was based on two lines. In the first were four ships of the first division, *Queen Elizabeth*, *Inflexible*, *Agamemnon*, *Lord Nelson*. Taking station in line abreast, 14,000 yards from the Narrows, they would engage the principal forts on both sides and carry out a long range bombardment. The second line was for closer action, and the honor of forming it in the first instance was accorded to Admiral Guépratte's division, *Suffren*, *Bouvet*, *Gaulois*, *Charlemagne*, *Triumph*, *Prince George*. The four French ships were to take station astern of the first division on the 16,000-yard line, while the two British ships, *Triumph* and *Prince George*, would advance to the 15,000-yard line and, taking station on either quarter of the first division, would first deal with the main forts of the intermediate defenses on each side, assisted if necessary, by the wing ships of the French division, and afterwards devote themselves to the concealed howitzers. As soon as the first division began to dominate the main forts, the four French ships would pass through the intervals and engage the same targets, gradually advancing to the limit of the swept area, that is, 8000 yards from Rumili. As they progressed the first division would follow in support up to the 12,000-yard line. After four hours the French division was to be relieved by Captain Hayes-Sadler with the *Ocean*, *Irresistible*, *Albion*, *Vengeance*, *Swiftsure*, and *Majestic*. Center ships of the second line were to deal with mine-field guns not in forts. Wing ships of both lines were to take on dispersed howitzers and field guns.

By this arrangement it was hoped that sweeping could begin two hours after the bombardment commenced and, as the work proceeded,

the advanced line would move in and endeavor to complete the destruction of the forts at decisive range.

Observation of fire was left entirely to the airmen, and arrangements were made for a seaplane to go up every hour. An armed picket boat attended each battleship to guard against floating mines.

Weather conditions on the morning of the eighteenth were excellent. At 10:30 A. M. the *Agamemnon* began to lead the first division into the Straits. Within half an hour they came under howitzer fire and, although the ships returned it, the annoyance continued to increase. The ships reached their assigned positions and opened fire about 11:30 A. M. Scattered guns and howitzers seemed more numerous than ever, but in spite of the galling fire the first half hour of the bombardment gave good promise of success.

The *Queen Elizabeth*, wing ship on the European side, took for her target the formidable Hamidieh I, which, probably owing to the great range, did not reply. The *Agamemnon* fired on Rumili, the *Lord Nelson* on Namazieh, and the *Inflexible* on Hamidieh II. From the forts there was little or no reply but the barrage fire increased in volume and intensity.

At 12:06 P. M. sufficient damage to the forts seemed to have been done for the Admiral to signal the French division to pass through the British line and begin closer work.

All this time the concealed guns and howitzers had been getting more and more troublesome. The *Agamemnon* and the *Inflexible* soon began to suffer, the former being hit twelve times in twenty-five minutes, and the latter, having been hit repeatedly and being on fire, had to fall out of line.

The French ships, too, were unable at this time to advance nearer than ten thousand yards from the forts, for they were received with a heavy fire from the Narrows and the barrage. It was evident that the Narrows' forts had been far from dominated by the morning's bombardment. However the bombardment of the eight battleships now engaged began to tell, and by 1:45 P. M. the enemy's fire had so far slackened that the Admiral considered the time had come for calling up the mine sweepers. He also ordered Captain Hayes-Sadler's division to relieve the French line which had naturally been suffering. At the range to which they had now closed—about 9000 yards—the fire of the forts was fully effective. The ships had been hit again and again and the *Gaulois* had just been so badly holed forward that she had to withdraw, so seriously damaged that it was doubtful if she could be saved. She was later successfully beached on Drapano Island. The *Suffren*, too, had a bad leak forward and was in no condition to continue the action. Two of the *Bouvet's* casemates had been put out of action, and her bridge and her steering compartment were on fire. She was just about to pass

through the British line after being relieved when, according to Nevinson, "she was struck by three big shells in quick succession. The blows were immediately followed by a vast explosion. * * * In two or three minutes she sank in deep water just north of Erenkeui, carrying nearly the whole of her crew to the bottom."

The disaster did not check the advance of Captain Hayes-Sadler's division. They continued on, opening fire at 2:39 P. M. when the range was 12,000 yards, and gradually closing to 10,600 yards. The reply from the forts was not formidable. The only one that was firing briskly was the German-manned Hamidieh I.

It was difficult to state with certainty what effect the bombardment was producing. Although several commanding officers spoke of forts being silenced, the Admiral asserted that at a quarter past three all forts were firing rapidly but inaccurately. Hamadieh I was clearly undamaged for it was as active as when it first opened fire and was concentrating salvos of four on the *Irresistible* which at 3:32 P. M. had taken a slight list. The Admiral now signalled the advanced line to open out the range.

Since the forts were clearly not really out of action the projected attack on the mine field could not take place. Shortly after 4:05 P. M. the *Inflexible* struck a mine and began to settle by the head. A number of men were killed. She immediately made for the base at Tenedos, but it was doubtful if she could reach it.

At about 4:15 P. M. the *Irresistible* struck a mine, killing all but three men in the starboard engine room and completely disabling the engines. The ship was abandoned at 5:50 P. M. about 10,000 yards from Rumili, and the Admiral hoisted the "General Recall," it being clear that, in view of new and unexpected danger, the battleships could not be left inside the Straits after dark.

As the *Ocean* began to withdraw under heavy fire she struck a mine and at almost the same time a shell got home on the same side aft. The tiller room and the steering engine room were flooded and the helm jammed hard a-port. Repairs were impossible. The crew was taken off in destroyers and the *Ocean* abandoned. Both ships sank after dark. According to Schreiner, the *Irresistible*, after being abandoned, was sunk by gunfire from Rumili and Dardanos.

The remaining battleships were immediately withdrawn and the great attack came to an end.

According to Major Miles:

In their 12 actions against the forts, including the attack of March 18th, the ships had fired 2100 heavy and about 5500 medium caliber shells. In the March 18th attack, according to the Turkish General Staff, the fortifications sustained the following casualties: 'Four officers and 40 men killed, 70 wounded, eight guns damaged and some ammunition depots and barracks destroyed.'

Schreiner gives the casualties for the day, "twenty-three Turks and Germans dead and seventy-eight wounded. Many of these are civilians." Also

The damage done by the bombardment is hardly what I expected. Fort Dardanos has had a miraculous escape. There is a small dent in Turret No. 1. Turret No. 3 was struck by a shell fragment near the gun port. As a result of that the gun could no longer be elevated or lowered. But a little work with a steel saw fixed that. No. 5 Turret was slightly damaged near the base.

In Fort Rumili two guns are temporarily out of action. In Hamidieh II a gun is dismounted. One of the casemates there was demolished. Fort Chemenlik mourns the temporary loss of a gun. In Hamidieh I a 35.5-cm. gun has been torn from its anchorage and its carriage has also been badly mauled. Here too a casemate caved in.

CONCLUSIONS

It must be admitted that the final attack on the Narrows forts was a colossal and a costly failure. Sixteen battleships mounting two hundred fifty-eight guns—of which seventy-two were 10-inch or greater—took part in the bombardment. Three battleships were sunk, one at least by gun fire, and three more were put out of action for an indefinite period. Thus one third of the whole Allied battle fleet was spent in one day's operation, and about seven hundred men were killed or drowned. On the other hand, although the Turkish ammunition supply was seriously depleted, and the fabric of the main forts considerably damaged, only one of the fort guns was permanently disabled, and only four officers and forty men were killed.

Although a large part of the Allies' losses were caused by mines, the mine fields existed because of the inability of the ships to destroy the guns of the intermediate defenses.

The results of the final attack may be summed up as follows:

The Allies lost forty-four large- and medium-caliber guns. The Turks lost one.

The Allies had put out of action for an indefinite period fifty-two large- and medium-caliber guns. The Turks had temporarily out of action seven guns.

The Allies lost about seven hundred officers and men. The Turks lost about forty-four.

It would appear that Napoleon was right.

Inspections as a Part of Training

I. CLASSIFICATION AND OBJECT OF INSPECTIONS

By CAPTAIN J. H. COCHRAN, *C. A. C.*

THE office of inspector general dates from December 13, 1777, although Lieutenant Colonel Mottin de la Balme, a French cavalry officer, was appointed by Congress July 8, 1777, inspector general of cavalry; and on August 11, M. du Coudray, a French artillery officer, was appointed inspector general of ordnance and military manufactures. Neither of these officers performed much service as inspectors, for the entire cavalry of our army then consisted of but four small regiments, used chiefly as escorts, messengers and orderlies, while the ordnance and military manufactures had not yet been organized. De la Balme resigned three months after his appointment and Du Coudray was drowned a month after assuming office.

The next foreigner to be appointed inspector general was the notorious Colonel Thomas Conway, of the infamous Conway cabal. He was given the rank of Major General and held office until April 28, 1778, when he resigned. He never assumed office.

The man next to assume the office of inspector general, and who was destined to lay the foundations of the American Army, was Lieutenant General Baron von Steuben, who arrived in December, 1777, at the age of forty-eight years, and joined the army as a captain in February of the following year. He had commenced his military career when a child as the companion of his father, an engineer officer of the Prussian Army, and became aide-de-camp to Frederick the Great. Washington proposed that he undertake the office of inspector general and he was accordingly detailed on March 28 with the rank of Major General. In the meantime, Steuben had organized a select company of 120 men to act as a model for the rest of the Army, and at this point the first competitive training in our Army may be said to have commenced. General Steuben was also assigned sub-inspectors as inspectors of brigade, among whom were Barons Arendt and Holtzendorf.

This order was followed by others requiring regimental commanders to review and inspect their regiments weekly, brigadiers their brigades fortnightly, and major generals their divisions. The inspectors were held responsible for the discipline of the troops and that all instruction

conformed strictly to that given by the Baron to the model company and issued by him with the consent of the general-in-chief.

In a letter from Washington to Congress at this time we find that the duties of the inspector general were to form a system of manual and maneuver, to prepare all necessary regulations for the government, discipline and arrangement of the Army in all its branches, and to see that they were strictly observed. The inspectors were to be considered the "instructors and censors of the Army in everything connected with its discipline and management."

The condition of our Army, prior to the installation of the first system of inspection, should be understood. Without sufficient arms, clothing, rations, medicines, money, organization, instruction or discipline, it was deplorable in all respects. There was no uniformity, while the short terms of enlistment — three, six, and nine months — kept up a continual flow of men, who, as they left for their homes, carried off with them everything serviceable in their possession. These fluctuations destroyed the significance of divisions, brigades and regiments which bore no semblance to such organizations. It was impossible to obtain correct returns of the troops, the arms, supplies, or in fact, a reliable report of anything. Drill regulations of any kind were unknown; each colonel and general had a system of his own; there was no military code. The interior economy and administration of regiments and companies did not exist; quartermasters obtained supplies and issued them, when their responsibility ceased, while that of the captains was never assumed; hence the deficiencies were not known or explained. Officers and men absented themselves at will; desertion was general, and jealousies, bickerings, misunderstandings, insubordination, extravagance, and waste of all kinds prevailed. Unfed, unpaid, insufficiently sheltered, and literally naked, the Army presented a picture of inefficiency almost beyond remedy. These conditions naturally suggested to such an experienced officer as Steuben the appropriate remedies, and although many of them were beyond his reach and he labored under the disadvantage of not knowing the English language, he set about his task.

In March, 1779, our first drill regulations, "Regulations for the Order and Discipline of the Troops of the United States," appeared, and were the work of Steuben. Many of the rules prescribed and the customs resulting from them are still observed in the Army.

The organization of the inspectorship being now completed, Washington, on July 1, 1779, issued an order prescribing a monthly inspection of the whole Army and directing that at these inspections the inspectors be furnished by all company commanders with exact returns of the troops and of all government property since last inspection as well as

*Kapp's *Life of Steuben*.

that on hand. These returns were consolidated into division returns for the information of division commanders.

William North, writing of these times, says:

With what strict scrutiny were the inspections made. I have seen the Baron and his assistants seven long hours inspecting a brigade of three small regiments. Every man not present must be accounted for; if in camp, sick or well, they were produced or visited; every musket handled and searched, cartridge boxes opened, even the flints and cartridges counted; knapsacks unslung and every article of clothing spread on the soldier's blanket, and tested by his little book, whether what he had received from the United States within the year was there, if not, to be accounted for. Hospitals, stores, laboratories, every place and every thing was open to inspection and was inspected, and what officer's mind was at ease if losses or expenditures could not, on the day of searching, be fully and fairly accounted for? The inspections were every month, and wonderful was the effect, not only with regard to economy, but in creating a spirit of emulation between different corps. I have known the subalterns of a regiment appropriate one of their two rations to the bettering the appearance of their men, but this was at a later period of the war, when supplies and payments were more ample and more regular.

Another patriot may be mentioned as one having left his impress on the office of the inspector general of the Army was Alexander Hamilton. He was made a major general and inspector general in 1798 when war with France threatened. Among the many improvements that he recommended was the establishment of a military academy which had also been suggested by Steuben.

Since this standard of inspection was set in the Revolutionary War, our system has been as thorough but has been changed somewhat in the methods used. Our present policy is set forth in Training Regulations 10-5: *Basic Doctrines, Principles and Methods*:

Inspection is a function of command and will be frequently made by commanders of every grade and their staff officers, to satisfy themselves that programs are being followed, that approved doctrines, principles and methods are being used, and to test efficiency. No individual or unit will be tested, or a demonstration demanded therefrom requiring proficiency in advance of that required in its program, except upon application of the individual or of the commander of the unit concerned.

Inspections, therefore, are to be made by officers from the highest authority downward. However, in order to limit this discussion to the details that directly affect most of us, we will begin with those of the Corps Area Commander. These can be divided into the four general classifications:

- General inspections,
- Materiel inspections,
- Tactical inspections,
- Training inspections.

In August, 1879, the Secretary of War directed that a general inspection would be made by the inspectors general of all posts and camps at least once each year and this is embodied in present Army Regulations. This inspection is made by the inspector general (and his assistants) on the Corps Area Commander's Staff. Its object is to promote general efficiency, determine whether or not the law and regulations are complied with by executive and administrative departments and to observe and report upon the disciplinary and administrative efficiency of commands, officers and troops. It is the War Department estimate of our military preparedness. The scope of the inspection will be discussed later.

Once each year a general inspection is also made of the National Guard in each corps area. While it is conducted under the direction of the Corps Area inspector general, it is the custom to assign as inspectors selected officers of the same branch as that of the unit being inspected. The object of this inspection is the same as that of the Regular Army. Particular attention is given to the care being taken by the National Guard of Federal property and other matters as stipulated in Section 93 of the National Defense Act.

The specific training functions of a territorial commander, both in peace and in war, are:

a. Supervision of training and instruction, and responsibility for efficiency of all individuals and of all units, organization and establishments within the limits of his command, in accordance with the doctrines announced by the War Department, except in so far as exempted from his control by the Secretary of War.

b. Inspection by himself, or his representatives, of all military activities within the limits of his command except in so far as exempted therefrom by the Secretary of War.

c. Combined practical training of the personnel under his command.

* * * * *

e. Supervision of training and instruction of the National Guard, Organized Reserves and units of the R. O. T. C., the maintenance of the personnel, and information and plans necessary for immediate mobilization in accordance with instructions announced by the War Department.*

At least one tactical inspection yearly by the Corps Area Commander is required by Army Regulations. This may be combined with a training inspection. It might be well here to describe the objects of these two inspections.

Tactical and training inspections are utilized to produce battle efficiency. Battle efficiency involves efficient training supervision, adequate training plans and a correct application of approved doctrines, principles and methods.

The specific purposes of tactical inspections are to promote and ascertain the efficiency of training and instruction, the battle efficiency of

*Training Regulations 10-5.

units and the officers thereof and the readiness of a command for active field service.

The purposes of training inspections are to examine and observe training with a view to insuring comprehensive, practical and adequate training programs and school courses; conformity with approved training doctrines, principles and methods; compliance with approved programs and courses; suitability and effectiveness of instructing personnel; systematic and thorough training.

Tactical and training inspections are usually under the supervision of the G-3 of the Corps Area Commanders's staff.

The tactical and training inspections of the National Guard are made at the annual encampments and conform to those of the Regular Army.

The Coast Artillery District Commander is held responsible to the Corps Area Commander for the instruction, training, and tactical employment of all coast artillery troops within the district and he, or the members of his staff, is required to visit frequently the various units for the purpose of observing their condition with regard to all matters affecting the efficiency of the personnel, organization, training, equipment, and condition of materiel. At least once each year he will make a formal tactical inspection, preceding that of the Corps Area Commander.

The Harbor Defense Commander has the same responsibility within his command as the district commander and is required to make at least one formal tactical inspection yearly, preceding that of the district commander. Two members of his staff, the harbor defense artillery engineer and the harbor defense ordnance officer, are required by Army Regulations to make frequent inspections so as to be informed of the condition of materiel pertaining to their respective departments and the sufficiency and use of such materiel.

The Fort Commander is responsible to the harbor defense commander for the same items as mentioned under the district commander and will also hold at least one tactical inspection yearly prior to that of the harbor defense commander.

The Group Commander is responsible only for the drill and tactical efficiency of his command. He is required, however, to keep the fort commander informed of any deficiency of equipment or supplies within his command. He will *make at least one formal tactical inspection each year prior to that of the fort commander.*

The Battery Commander is required to make such inspections of his command as will insure his being fully informed at all times of its condition.

II. INSPECTIONS

By 1ST LIEUT. P. T. GREGORY, C. A. C.

This presents to your minds the days of formal inspections where, weeks before, you prepared for that great event. All other activities ceased, even the necessary fatigue. No one was excused from attending this momentous occasion except the portly Sergeant Major and the telephone operator on duty. Their mission was similar to that of Paul Revere. They remained at their posts in order to receive all messages announcing more inspections yet to come.

The types of inspections are so numerous and their scope so extensive that I shall merely attempt to review with you the Tactical and Training Inspections.

a. (1) The specific purposes of tactical inspections are to promote and ascertain—

The efficiency of training and instructions.

The battle efficiency of organizations.

The battle efficiency of officers.

The readiness of a command for active field service.

(2) The scope of the tactical inspection should comprise the solution by commands and individuals of tactical, field firing, supply, and communication exercises sufficient for the purposes as indicated. As far as practicable the exercises should be conducted by units of maximum strength, equipment, and transportation. Terrain exercises, tactical marches, or map problems should be substituted only when a reduced strength makes it necessary. The inspection should be planned to promote combat efficiency, to demonstrate battle conditions, and to teach specific lessons as well as to test the efficiency of leaders, units, and training methods. The irregularities and deficiencies noted in these inspections should be made the subject of a critique held immediately following. Even though the command as a whole makes an excellent showing, the correction of details will insure a smoother running machine.

b. (1) The specific purposes of training inspections are to examine and observe training with a view to insure—

Comprehensive, practical and adequate training programs and school courses.

Conformity to approved training doctrines, principles and methods.

Compliance with approved programs and courses.

Suitability and effectiveness of instructing personnel.

Systematic and thorough execution.

(2) The scope of training inspections should comprise an examination of the current school or training year, such assemblies, conferences, tests, and exercises as may be required to carry out the purpose of training inspections. However, no demonstration or tests should be held requiring proficiency in subjects in advance of the approved programs. These inspections should be continued throughout the year and no limit as to their number. This analysis should usually include inquiry into the general plans of training to determine their suitability; systematic examination of the program from the viewpoint of their scope, logical and progressive sequence of subjects, and the allotment of time to each in accordance with its needs and importance. Conclusions as to the effectiveness in the application of plans and the efficiency obtained can be determined only by frequent inspections on the training grounds.

c. Every commander is responsible for the military instruction of all personnel, units and activities under his command, as well as for the preparation and readiness of units for active field service. He should personally supervise the preparation of training programs and their execution. He should make such inspections as will keep himself informed of the state of his command relative to the efficiency and standards required by regulations, in addition to rendering such assistance and instruction, on his own part, as may be necessary for the elements of his command to attain the highest possible degree of military efficiency. The only way he can enhance his intellectual activity in conceiving orders is personally to inspect their execution. These inspections may be formal or informal. In either case they should be constructive in nature. The formal inspection will be the commander's final determination, for the period covered, of the efficiency of the elements inspected. Inspections, both formal and informal, are a routine part of instruction and should be carried out to the most minute detail. In this connection special attention should be given to troop leading and practical combat exercises. Subordinate units should be so coordinated that they may readily fit into the command machinery and the tactical team. As the proportion of company and platoon commanders without war experience increases, more and closer attention should be given to practical combat training of subordinate commanders. This requires frequent inspections and personal efforts by senior officers to insure that the proper methods are being utilized to attain the prescribed standards. Much instruction can be accomplished by comparative and competitive inspections. Tests between organizations conducted in a spirit of fairness and helpfulness and results published will do wonders in improving the efficiency of a command. Only mediocre and indifferent officers resent comparison.

Every one is familiar with the formal inspection. This no doubt is a necessary evil and will be continued. On the other hand, is the informal

inspection of sufficient merit to justify me in relating an example of its successful operation? In the Hawaiian Coast Artillery District there was at one time an inspector. Some of you may have met him in the First Army, some in Hawaii, others elsewhere. However, no matter where you met him he was always the "*Official Scrutator.*" He would suddenly appear in the organization and after bidding you a cheerful "*Good morning*" would announce that he was there to see at first hand the progress the organization was making. Whereupon, he would present to you one of his *Questionnaires*. This questionnaire is very complete and covers all the details necessary for any coast artillery organization. It contains specific questions requiring answers, "Yes" or "No." Somewhat similar to the "True and False" system employed in the Coast Artillery School. There was no chance for this inspector to miss any vital points by his attention being directed elsewhere. This form was filled out by the inspector as he proceeded, and in due time it was back in the organization showing in black and white the shortcomings to be corrected. Throughout the District, like inspections were held covering all activities and training — the results of which were published and the several organizations winning were awarded suitable trophies. This system of instructive, competitive training and inspections instilled into all organizations the spirit to pursue an ever advancing standard of *Excellency*.

III. THE PROPER CONDUCT OF A TACTICAL INSPECTION

By 1ST LIEUT. A. F. GILMORE, C. A. C.

The purposes of a tactical artillery inspection of a fort are to promote and ascertain combat efficiency, to demonstrate battle conditions, and to test the efficiency of leaders, units, and training methods. Army Regulations 265-10 prescribes that such an inspection be made by the fort commander once each year. Since combat efficiency may only be obtained through training and instruction, the most appropriate time for such an inspection is at the close of the artillery training period.

There are, no doubt, several methods that a fort commander might employ in making a tactical inspection of his command and which would be satisfactory, but to me, the method which will be outlined later appears to be the most logical of any that might be chosen. During the artillery training period the fort commander, from frequent informal inspections at times when the batteries are engaged at drill, is able to judge the ability of the battery personnel to man the guns. He can determine whether each individual battery is capable of conducting target practice or not. He can also judge whether the methods of training are effective or not, but he cannot judge the battle efficiency of the command or of the

leaders from such inspections. By means of a tactical inspection he should be able to determine the latter to a greater or less degree.

Since an inspection of this nature is for the purpose of determining battle efficiency, the inspection should assume battle conditions as far as possible; should be made interesting as well as instructive, so that the entire command will be benefited by it. The fort commander can accomplish this by preparing before the inspection and in typewritten form a series of problems, or what might better be called situations — situations that might actually exist in time of war. These situations can be divided into two groups, the first and of which there is but one, is the general situation, and the second, of which there may be as many as the time of the inspection will permit, is the special situation.

The general situation contains, as might well be guessed, such general information as to state of war between certain powers, time of the situation, the classes and number of vessels that may be expected, approximate location, speed, the length of time that the fleet has been under way, the nearest enemy base, and any other information concerning the enemy that might be appropriate. It contains also information concerning our own fleet. This general situation is given to the group commanders and the searchlight officer a day or so in advance of the scheduled inspection, so that they may acquaint themselves, as well as the battery officers, with the problem. It is accompanied by an administrative memorandum giving the details of the inspection. It includes the requirements of supply, the manning of the batteries, the method of recording all orders given and received, the recording of the time of each shot, the time and place of the critique, and any other details which might be considered essential.

The general situation is of course a forerunner of the special situation. Therefore, the latter is drawn up in proper sequence to the former. It shows maneuvers of the enemy vessels being made in certain water areas which would point to some contemplated action on the part of the various elements of the hostile fleet. It gives also the time of the situation, class of ships, number in each class, speed, direction of movement, and approximate range. They are so prepared as to give each group commander an opportunity to demonstrate his tactical ability.

On the morning of the inspection the group commanders' posts, searchlights and batteries, with the exception of the gun sections, are manned. The fort commander conducts the inspection from the fort command post. At the beginning of the inspection the first special situation is given by telephone to the group commanders and the searchlight officer and, as a rule, will not call for any action but will give a more accurate description of the impending action. After sufficient time has elapsed for a study of it, a second special situation is given out which designates action to be taken by a certain group. This group commander locates on

his chart or plotting board the elements of the enemy fleet with which he is concerned, and determines with what batteries he will open fire and at what range, whether one or more targets should be assigned, and the total number of shots required to disable and put out of action the class of ship at which he is to fire. This having been determined he gives the order of fire to his batteries. The battery commander, knowing the length of time required for his battery to get into action after being assigned a target and knowing also the rate of fire of the battery, opens fire and continues firing until he has fired the number of shots ordered at the targets assigned him. Upon completion of this he reports the fact to the group commander. When this situation has passed, another is given out, which of course, will be at a later hour. In addition to giving information about the enemy it contains information concerning the damage inflicted upon the enemy and the damage sustained by the fort. It may call for action by one of the other groups or it may call for the combined action of the several groups. This situation is handled in the same manner as was the second. If there is not sufficient time for a fourth situation, this latter situation may call for action between sunset and sunrise so that the searchlights may be put into operation. As soon as the hostilities have been declared over, all of the artillery officers of the command assemble for critique.

This critique is conducted by the fort commander and takes the form of a discussion of the situations. Each situation is taken up separately. The group commander gives the situation as received by him and his line of reasoning that prompted him to give the order of fire that he did to his batteries. Each battery commander then gives the orders received by him from the group commander and the orders which he, himself, issued to his battery together with the reasons for those orders. If battery commander's action was given to any battery, the battery commander gives his line of reasoning to explain his method of fire. At the end of each situation so analyzed the fort commander makes appropriate criticisms which should be constructive rather than destructive in nature, the purpose being to show the proper solution of the problem rather than to reprove the officers concerned for any mistake made.

A tactical inspection has certain effects upon the personnel of the command, as well as a secondary effect upon materiel. It brings to the group commander a realization of his responsibilities in time of war, the necessity of knowing all of the details concerning the functioning of his group and the effectiveness of fire of his batteries at various ranges at the various classes of vessels which might appear within his area of defense. It places before the battery commander the importance of having a well-trained battery and also the importance of conducting fire on his own initiative in case the group and fort were put out of action. It acquaints

the enlisted personnel, such as telephone operators and recorders, with the terms, phrases, and words that might be used in time of war. It causes the materiel, especially that pertaining to the fire control system, to be brought up to the highest degree of efficiency for the inspection and brings to light any deficiencies.

By means of an artillery tactical inspection such as the one just described the fort commander can determine, first, the degree of efficiency of the training methods employed and, second, the ability of the command to act under conditions of actual hostilities.

IV. SUMMARY

By CAPT. J. B. VARELA, C. A. C.

We have seen that the creation of the Inspector General's Department, in conjunction with the system of inspections carried on by its officers under the direction of General Von Stueben, had a direct influence in increasing the discipline, training and efficiency of the Continental Army. That system of inspections introduced the first comprehensive method of training in our army and established the first standards of proficiency that were required from the various organizations in the performance of their military duties. The basic principles that were then instituted hold good to this day practically unchanged.

Our present system of inspections aims to determine the tactical proficiency of the troops, the thoroughness of their training, their moral and material well-being, and also the condition of the materiel with which they are equipped, for immediate use. In accomplishing this mission, it notes defects, suggests the remedial action that is considered advisable or necessary and sees to it that the necessary action is taken and that the defects noted are eliminated.

Inasmuch as the inspection not only discovers defects but indicates the manner to overcome them, it is an essential part of training.

In accordance with the principles laid down in our training regulations, inspection is a function of command. It is therefore the duty of all commanders to satisfy themselves by means of frequent inspections that the proper methods of training are being followed; that the instruction of the various units progresses in accordance with some definite program; and that the units achieve at the proper time that degree of proficiency which is the peace time equivalent of that objective that might have been assigned to them in actual conflict. To accomplish these results there are provided various types of inspections, such as General Inspections, Materiel Inspections, Tactical Inspections, and Training Inspections.

General inspections are conducted annually by the Inspector General and his assistants, and the results obtained form the basis for the War Department's estimate of our degree of military preparedness.

Materiel inspections have for their purpose to ascertain the condition of the materiel for immediate use.

The purpose of training inspection is to examine and observe training with a view to insure comprehensive training programs, suitability and effectiveness of instructing personnel and conformity with approved doctrines and methods.

The tactical inspection is conducted for the purpose of determining the degree of efficiency attained by the several units, as a result of training, and the readiness of a command for active field service.

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The American nation should always seek peace throughout the world, but, at the same time, it should ever be ready to gird itself for battle, in order to preserve the fundamental institutions of free government upon which rests the permanence of our republic.—*Secretary of Labor James J. Davis*.

Shooting up the Caribbean

By

LIEUTENANT COMMANDER E. E. WILSON

United States Navy

[Reprinted from *The American Rifleman*]

THE time was when there was great enthusiasm in the Navy for small arms. Each year when the Fleet migrated south after the Christmas holidays, the big ships assembled in Guantanamo Bay on the south coast of Cuba and went after it hammer and tongs. As many of the ship's company as could be spared were hustled ashore in heavy marching order. Over on Deer Point, that chalk-white promontory which thrusts out into the blue waters of the bay, tent cities sprang into being. Thousands of blue jackets in "whites" swarmed ashore. As soon as camp was made the rattle of musketry began and continued from early morn to sundown. Each battleship had an officer from the Navy Rifle Team and these team captains were soon hard at it, in friendly competition on the range by day and still more friendly competition at the club by night. This was all before we were purified by Mr. Volstead's Act. Men struggled and sweated in the blistering sun until they had rolled in the dirt long enough and then went back to camp for a refreshing swim in the clear, cool waters. Heigh Ho! Them were the "halycorn" days!

Under these conditions there grew up at Guantanamo one of the largest and best equipped ranges in the world. It is as large as Perry in point of numbers of targets, and covers considerably more ground. No pains were spared in its equipment and now it is second to none in completeness of appointments. And it is a hard range, too. Every morning within a few minutes of ten o'clock the Trade Wind comes whistling over the parched hills, sweeping down the various gulleys, it flops the unsuspecting bullet into the three ring and continues on to blow white dust into the shooters' eyes. There is no grass on the range and the glare is so bad that the bull at five hundred there looks like the ones at six hundred at Perry. And so it is a good range from every viewpoint, adequate, well located and sporty enough for any of us.

Lately, things have changed. Since the war we are more scientific and much of our time is devoted to Strategy and Tactics and guns and torpedoes. Some pessimists think we pay too little attention to fundamentals and too much to bunk. Be that as it may, shooting isn't what it used to be in the fleet. To be sure the parties go ashore as they used to,

but it is a desultory sort of drill, and the keen incentive of competition is lost. The heart seems to have gone out of the game and the old-timers are sad. They would like to see a revival but there isn't enough time now to get in the schedule of Gunnery Exercises, let alone strategy and tactics and machinery overhaul.

Ever since I last saw the deserted range at Guantanamo I have been mulling over the idea of introducing the military small bore rifle into ships as a means of training men in the use of the service rifle. It seemed perfectly logical that men could be taught to shoot well with the twenty-two and that much of the range instruction might be saved. In spite of the apparent logic of the thing, numbers of people said it could not be done. Last year at Perry, however, I saw something that convinced me it could. Every shooter there will remember the girl's team from Central High School, Washington, D. C. Most people will remember, too, how they took a day off from their Ballard guns, borrowed a service rifle or two, went over to six hundred and averaged about forty-seven the first time they ever fired. As I remember one little girl got a possible and there were some good men shooters who didn't do any better that day!

With this demonstration in mind I went to the Navy Department after the match and talked them into giving me four 1922 Springfields for "experimental purposes." The guns arrived just before we began the annual migration. My ship, the *Bridgeport*, is a Destroyer Tender, that is a repair ship and it didn't take long to build our range on board. In one of the compartments on the upper deck we found room for four targets abreast at 100 feet. We made up four bullet stops as described in the N. R. A. Small Bore Program, and went to it. About fifty men volunteered and we started right out with position and aiming exercises exactly as laid down in our Small Arms Firing Regulations. J. B. Smith, a Chief Machinist's Mate, formerly of the Navy Rifle Team, and still a shooting nut, took complete charge and ran the whole show.

Our training methods were absolutely standard and quite thorough. We kept the range open afternoons and evenings so that any one who cared to could shoot. We organized the usual matches and competitions and prizes and did the usual things to stimulate interest. The range caught on immediately and was so popular we had to run it overtime. Before long the men began to shoot so well that I was astonished. Within a month they were going strong. Since the object of the experiment was to determine whether or not men could be trained entirely on the small-bore and then moved right onto the range with the thirty caliber, we made no attempt to shoot the service rifle on shore.

All this sounds reasonable enough but it is not so simple as it looks. It must be remembered that we were cruising all this time and most of the time were either actually at sea with a roll and pitch on or anchored

in an open roadstead with considerable motion. This made it hard at times but we persisted and fired rapid fire, surprise fire and skirmish fire, all the stunts in our qualification courses. Work began about January fifth en route to Colon. It was continued in Chiriqui Lagoon, a smooth bay way down the Panama coast, at sea en route to Culebra, and there in an open roadstead to the eastward of Porto Rico. Toward the end of February we anchored in the quiet harbor of Kingston, Jamaica, for a well-earned recreation period of two weeks.

The rifle team was so anxious to get ashore and try the service rifle that we borrowed Normand Range and landed the party each morning. At first we confined ourselves to the small bore but when we were suddenly challenged by the Kingston Infantry Volunteers to a match, we put aside the little guns long enough to sight in the thirties. The match called for one sighter and seven shots for record at 200, 500 and 600 yards slow fire on the "B" target. If your first sighter was a bull you could call it your first record. That's their idea of the way to "make the sighters count"—and it is not so bad at that! Not only that but we fired eight men, the best six of them to count. How many team captains are there who have longed for the chance to drop the last two at one time or another! It is not a half bad idea.

The match proved to be easy for our men, in fact we had a margin of about twenty-five percent. Our poorest man was better than their best and all of our people, shooting mid range for the first time in their lives did remarkably well. Some of the best scores were shot by men who had never fired a service rifle before and in fact had never fired any kind of a rifle six weeks before. Naturally our fame spread throughout the island and we found ourselves challenged again.

The second match was more curious than the first. It was fired against the West India Regiment, a regular organization constituting the garrison of the island. The course was 200 and 500 slow fire and 300 rapid. The target was one of those tin hat things. As I remember it was three feet square at short range with a tin hat four by eight inches, colored black, mounted in the center. The upper half of the target was sky-blue and the lower half khaki with the tin hat sitting on the horizon. A hit on the hat counted four. An "inner" or three was a hit in the space between the hat and the ring spaced one inch from its outline. The two or "magpie" was a hit in a circle twelve inches in diameter with the center at the center of the hat. An "outer" or one was the rest of the target. At five hundred yards all target dimensions were just twice these. Eight men fired two sighters and seven shots for record, all prone.

The strange target and unusual conditions had us worried a little. The tin hat was not easy to see. Furthermore when we came to shoot the rapid fire we found we were supposed to shoot as many shots as we could

get out in a minute. Knowing the capabilities of the Enfield along that line we were bothered some. We agreed, however, to shoot two clips of well aimed shots and trust to luck. Most of their shooters got out fifteen shots in the time allowed, but they seemed to concentrate more on getting them out than on getting them in, for we won the range handily and, in fact, the match. The final score was 515 to 400. One of the sailors, for the team was entirely enlisted men, got a possible at 500 and we learned that this was extraordinary to say the least.

The matches over, we decided to shoot the sharpshooter's course for qualifications. With no preliminary runs we fired for record immediately and qualified twenty-two of the squad of twenty-nine the first time over the course. Of the twenty-nine men, twenty-two had never fired a service rifle before entering the matches a few days previous. This was encouraging to say the least. In six weeks we had made riflemen out of recruits, using nothing but the small bore.

We left Kingston about the middle of March and returned to Culebra. There we continued the small bore, polishing off our technic. The fleet rifle matches had been announced and were to consist of three events. These were all to be fired over the qualification course. The first was the Enlisted Men's Team Match for the fleet trophy, consisting of eight enlisted men of the Navy. The second was the Navy Department Match between teams of eight members, two of whom might be officers and half of whom might be marines. The third was the famous Auckland Cup Match between teams of four officers from each ship. Captain R. D. White of the *Bridgeport* had, when a youngster, shot for this cup a number of times without winning it. Now he came out with the rest of us to shoot the small bore and battle for a place on the team!

In the course of events we did some cruising in and out of Culebra. At San Juan, Porto Rico, we tried to get a match with the troops ashore, but they were busy with their qualifications. In due course we arrived at Guantanamo and promptly established our camp on Deer Point. In the next two weeks we fired once over the course, sixty shots per man, an average of ten times. The battleship *Wyoming* after a month on the range had fired her team for record and gone north. The *Florida* and *Utah*, two other battleships, had been on the range about seven weeks. Each of these ships had a crew of nearly three times that of the *Bridgeport* and each had a marine guard from which to pick. Everybody knows how the marines can shoot and we didn't have a one. Eight teams entered the three matches and when we lined up on "a range" we made the drab hills rattle to the tune of musketry as they had in the days of yore.

Stories of rifle matches are often uninteresting. This one was particularly dull because there was so little competition. Our enlisted men's team was never pushed and won with 87 points to spare. The mixed team

in the Department Trophy Match won handily and I'm sure I will be pardoned if I took an extraordinary amount of pleasure in beating those marines. They have cleaned us so often of late that we rate at least one little dig at them! Best of all, our officers team annexed the Auckland cup by a comfortable margin for the first time the cup has been won by other than a battleship. Captain White shot on the team and made a better score than the present author. And thus we scored a clean sweep for the small bore, demonstrating that a cruising ship can get her training on board almost as well as ashore. Furthermore she does not need a smooth anchorage. All she does need is the initiative.

Now we thought we were pioneering a little on the *Bridgeport* and were a little proud. It was at Kingston that we fell in with H. M. S. *Curlew* of the British Navy. One of our men in showing one of their men about the ship was bragging a little about our progressive methods of small arms training. When he had finished the Britisher remarked, "Ah, yes! Very interesting. We do much the same thing on the *Curlew*. Our club has about 75 members and we use the B. S. A. All of our crew shoot quite well!" There you go. Everytime you think you've discovered America you find Columbus was here in 1492.

EDITOR'S NOTE: *This convincing demonstration of the value of small-bore shooting should appeal to every reader of the JOURNAL. Whether on duty with Regular troops, R. O. T. C. units, National Guard, or whatnot, no live Coast Artillery officer can overlook the possibilities of a sport so valuable, so interesting, so cheap, and so well adapted to circumstances that impose a very limited extent of space for ranges. Cellars, attics, and vacant lots alike invite the crack of the .22-caliber rifle and revolver. The company commander who wants to make a record on the range and the officer serving with National Guard or R. O. T. C. outfits who desires to stimulate interest in things military will all find this sport a real God-send.*

The following extract from a letter of Mr. C. B. Lister of the National Rifle Association is worth quoting:

Due to the ease with which .22-caliber ranges, either indoor or outdoor can be installed as compared with the difficulty of finding a suitable site and the expense of construction for the .30-caliber range, we have consistently pushed the .22 as the ideal weapon for the training of civilian riflemen. The ratio of .22-caliber to .30-caliber shooting in the United States is at the present time four or five to one. A very comprehensive scheme of matches and qualification firing, both indoor and out, has been evolved for the .22 and is a regular part of the Association's yearly activities. Special individual inter-company and inter-regiment matches for the regular Services, National Guard, and Reserve Corps have been made a part of these programs this year. The Ordnance Department has authorized the manufacture of .22-caliber Springfields for use by troops armed with a rifle for training purposes. The cost of .22-caliber ammunition is negligible as compared with the cost of .30-caliber ammunition, even the war-time product. The accuracy at all ranges up to 200 yards is exceptional and the basic lessons of trigger-squeeze, sight adjustment, and proper firing position can be taught more easily with the .22 than with the .30. It is, I think, a truism that all of us are natural flinchers. We can train ourselves to not flinch, but the recruit, given the .30-caliber rifle for the first time, knows it is going to kick and is much more likely to develop a pernicious flinching habit than the recruit who is given a .22-caliber rifle which he knows will not

hurt him. Having learned how to manipulate the gun, how to sight it, how to adjust his sights, how to squeeze the trigger, and having been impressed with the necessity of holding it correctly, he will move over to the higher-powered gun confidently and with the chance of flinching reduced to a minimum if not absolutely eliminated. Many of these civilian and National Guard teams which have made splendid showings at the National Matches in years past have devoted practically their entire winter and spring schedule to .22-caliber work. The experiment conducted by Commander Wilson on the BRIDGEPORT with an absolutely green crew and in plain view of the doubters of the Atlantic Fleet would appear to thoroughly substantiate these facts.

The following may be obtained, without cost, on application to Mr. C. B. Lister, National Rifle Association of America, 1108 Woodward Building, Washington, D. C.:

Plans for small-bore ranges.

Program of the N. R. A. annual outdoor rifle and pistol competitions.

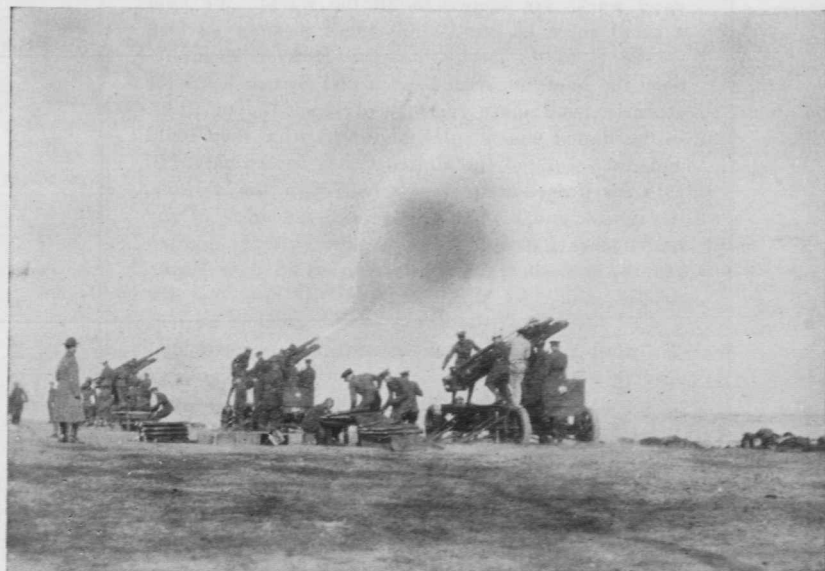
Program of the N. R. A. annual gallery rifle and pistol competitions.

If a range can be built and used successfully on a ship, YOU can certainly do it on land. Try it!

The United States like all other powers is accustomed to send its warships to unsettled regions where imperfect governments need reminders to do right. In Asia Minor the United States has been concerned to protect and sustain its missionaries whose good works are known to all the world. We kept a small force of small ships there to urge Turkish governors to do justice, but the Mediterranean has been the home of great French and British fleets for centuries, and more recently of great Italian fleets, so the Pashas and people judging by what they could and did see rated the United States accordingly. In 1919 the United States sent a battleship, the *Arizona*, the newest and biggest we had and the finest of any nation that has ever been in the Eastern Mediterranean, and when she showed herself in Asia Minor, people said, "We did not know till now that the United States was the equal of the greatest powers. We must treat American missionaries accordingly." And so a mere show of force reduced the chances of provocative conduct leading to international tension and so to war.—*Admiral William L. Rodgers.*



ANTI-AIRCRAFT MACHINE GUNS IN ACTION



ANTI-AIRCRAFT GUNS IN ACTION

EDITORIALS

The Chief of Coast Artillery

ON March 19 Major General Frank W. Coe, having been Chief of Coast Artillery during the eight most interesting and, perhaps, most difficult years in the history of the Coast Artillery Corps, takes advantage of the present comparatively stabilized period in military affairs by voluntarily transferring to the retired list upon the completion of over thirty-seven years of active duty in the Army. After a more diversified military career than usually fell to the lot of an Army officer prior to the World War, General Coe, on May 24, 1918, became Chief of Coast Artillery. Returning from France, where he was in command of the 1st Separate Brigade, Coast Artillery (subsequently 30th Brigade, C. A. C.), and the Railway Artillery Reserve, he took up his duties at a time when the Coast Artillery was undergoing a veritable upheaval. Strange weapons and strange duties had been and were being taken over by the Coast Artillery; railway artillery, heavy tractor artillery, trench mortar artillery, antiaircraft artillery, sound ranging service, all had to be organized, developed, and brought to a state of efficiency for war purposes. Then, suddenly, came peace and, with it, the problem of reduction and reorganization to fit in the new weapons and to re-create the peace-time efficiency of the Coast Artillery Corps.

All this General Coe has accomplished. Under his guidance during the past eight years the Coast Artillery has advanced rapidly and with tremendous strides, greater perhaps than we, with our limited perspective, can yet appreciate; but we are now apparently entering upon a period of comparative calm, of more deliberate progress, in which we can continue our advance, but with shorter and more unhurried steps. General Coe seizes the opportunity to give up the arduous duties of his office and to transfer his activities to other lines of endeavor. He carries with him into private life the respect and affection of the Coast Artillery Corps and its heartiest wishes for his success in his future career and for his continued health and happiness.

For our future we must look to his successor, Major General Andrew Hero, who becomes Chief of Coast Artillery on March 20, but who has already entered upon the duties of his office. To General Hero we extend

our cordial greeting and we wish for him the success during his tenure of office which his distinguished services and his well-known capabilities foretoken.

Mobilization of Aliens

According to Mr. Webster's justly popular work, mobilization is the "act of assembling, equipping, and in all respects preparing for active hostilities a body of troops or war vessels; the transformation of a military or naval force from a peace to a war footing." This definition, entirely accurate when it was written, now requires modification and extension if we are to grant that present day usage of the term is correct. For example, during the war and afterwards we heard a great deal about the mobilization of industry, a usage which by no stretch of the imagination can be brought under Mr. Webster's definition. We are, therefore, led to define mobilization as the "act of assembling, assuming control of, equipping, and in all respects preparing for active hostilities the personnel and materiel required in the prosecution of a war; the transformation of national resources from a peace to a war footing." In the light of this definition, any gathering together for control of war supplies and factories therefor, any assembly of personnel in the military and naval services or out of them, may properly be spoken of as mobilization. This leads us into a field of utmost importance to a country with a large foreign-born population, one concerning which little has been spoken and less written but one which may be called the mobilization of the aliens.

Again referring to Mr. Webster, we learn that an alien is "one owing allegiance to another state; a foreign-born resident of a country in which he does not possess the privileges of a citizen." In time of war, foreign-born residents of this country, that is, aliens, may be classified as enemy aliens, owing allegiance to a country with which we are at war; allied aliens, owing allegiance to a nation allied with us against a common enemy; and neutral aliens, owing allegiance to a state not concerned in the war. In each of these classes aliens may be further classified as declarant and non-declarant aliens. A declarant alien is one who has taken out his first naturalization papers and has thereby declared his intention and desire to become a citizen of the United States. A non-declarant alien is one who has not taken out first naturalization papers.

The world-war registration of nearly four million aliens indicates that our foreign-born population will approximate fifteen per cent of our total population. Of the foreign-born males of military age, the JOURNAL estimates that some two-thirds will come in the class of non-declarant. A continuation of the present immigration laws, however, may tend to

reduce this figure. As to distribution, practically every country in the world will be represented among our aliens, with Europe furnishing by far the great majority. It is obvious then that war between the United States and any other nation will provide a big problem in the disposition of the three classes of aliens — enemy, allied, and neutral.

International law recognizes a few basic principles in connection with the control of alien residents, but does not treat of the matter in detail. For example, an alien in the diplomatic service is exempt from military service; an enemy alien obviously should not be considered subject to military duties; a transient alien cannot be compelled to serve in the military forces; a domiciled alien, that is, one who is a permanent resident, can be required to perform military services. All of these provisions however are subject to change by treaty, and treaties, with their varying provisions, are bound to result in inequalities of requirements. It is, of course, evident that whatever rule may apply to one should apply to all in the same class; and it is equally evident that rules governing the several classes should be prepared with deliberation.

Unquestionably the subject is one which has received some thought in the United States, but whether it has received sufficient consideration is a question. As early as the Conscription Act of March 3, 1863, we find the United States declaring that declarant aliens are subject to military service. Much the same statement is included in the Act of April 22, 1898, and again in the Selective Service Law of May 18, 1917; but all these acts were war-time measures, enacted for war-time purposes, and did not fully cover the question of mobilization of aliens, nor did they determine a comprehensive policy covering all classes of aliens. Moreover, the policy of the United States in such a matter should not be left to war-time legislation. The alien, declarant or non-declarant, should be in a position to know from peace-time legislation just what his rights and privileges will be during war-time under whatever conditions the war may come, and in whatever class the war may place him. He should know under what conditions he may waive his rights and privileges and what benefit may accrue to him in case he does so waive. It is true that under the present immigration laws there will be admitted to the United States some one hundred sixty-five thousand immigrants as compared with some seven hundred thousand annually admitted in the earlier years of the present century. Nevertheless, the number of aliens resident in the United States will remain a tremendous problem in time of war for a great many years to come. The JOURNAL has no detailed solution of the problem to offer, but it does believe that peace-time legislation should be enacted so as to place upon our statute-book the following provisions: In time of war, (a) All aliens between the ages of eighteen and forty-five should be registered; (b) All declarant aliens should be liable to military

service; (c) Enemy aliens should not be liable to military service, and their status during the period of war should be carefully and completely defined; (d) Non-declarant aliens should be permitted (and, if domiciled, might be required) to serve in the military or naval forces, and in such an event they should have some special privileges, as, for example, in obtaining full citizenship; (e) Non-declarant aliens who become such by transfer from the declarant class by withdrawal of their declaration of intention to become citizens should be thereafter debarred from the privileges of acquiring citizenship; (f) Treaties on the subject should be made to conform to the general policy and should be uniform for all countries.

The JOURNAL recognizes the fact that this solution is not complete, but it offers it for what it is worth. We firmly believe that some such legislation will tend greatly to promote the initial steps in preparation for war in that it will save the time necessary in formulating a policy after the outbreak of war; inform the aliens beforehand just where they will stand in the event of war; and save the time and confusion necessary to consider individual cases whose claims become unnecessary upon the declaration beforehand of a definite policy. Moreover, it will permit deliberate preparation of plans for the registration and control of aliens which can be put into operation upon the outbreak of war. The mobilization of aliens will thereupon become an automatic matter which will need no great amount of attention, and the time and energy thereby saved can be directed toward the main objective—the prosecution of the war.

Pacifists Busy Again

[Reprinted from the *Indianapolis Star*]

The report presented by E. K. Bixby, of Muskogee, Okla., chairman of the American Legion's Americanization commission, should arouse not only the members of the Legion, but all citizens who realize the importance of preparedness. No one who is familiar with the facts will accuse the American Legion of being a champion of militarism. Its members have been through one war and know what war means. They want no more of it themselves and are equally anxious to make sure that the country is spared the horrors of another conflict.

Nobody can be sure that another war will not come to this country. Few would have believed it possible, twelve years ago, that the United States would be involved in a struggle in Europe and that millions of our men would be sent to fight on foreign soil. It is not likely that there will be international conflict in the near future to threaten this nation, but nobody can be sure of that. The only safe and sane way to do, therefore, is to make reasonable preparation for an emergency.

Our Army has been reduced to the minimum for usefulness as a military force. It is a mere skeleton of what would be required in a crisis. Our Navy has been limited in agreement with other first-class nations. We are not looking for trouble and have no intention of making trouble for anyone. But it would be stupid on our part to ignore the fact that the unexpected might happen again, and to fail to avoid the disastrous mistake we made by being almost wholly unprepared when called on for action.

The insidious propoganda against the reserve officers' training corps and the citizens' military training camps, to which the Legion report refers, is directed at preparedness. No excuse exists for fearing that the work of the corps and in the camps will create a military spirit or that it will tend to involve us in conflict with any of our international neighbors. The pacifists are setting up a scarecrow which should not frighten any thoughtful citizen.

Both Wrong and Dangerous

[Reprinted from the *Chicago Tribune*]

Recently Miss Jane Adams and Miss Mary McDowell had a talk with Captain C. B. Hopkins and two fellow officers of the Military Intelligence association, discussing armies and peace, etc.

Miss Adams said the Army had not prevented the entry of the United States into the world war.

The officers replied neither did the peace talk of the pacifists.

The officers missed a point they might have made. In peace times the United States never had an army. It has only had some troops. The Army that did not prevent the entrance of the United States into the war was a force of only 97,000 officers and men, including the Philippine Scouts, neither organized nor munitioned as an army. The United States had no national defense act. The National Guard consisted of scattered, unorganized units, far under strength. When the country got into war it had to borrow guns in France and buy equipment intended for the Russians who had pulled out.

Germany looked across the Atlantic, smiled beneath its spiked mustaches, and refused to worry about a nation so ill prepared. Germany was not afraid to defy this country. Germany thought the United States would be less bothersome making war than it was making munitions for the allies.

Had the United States had an army it might not have been drawn into the war. The Army did not keep us out because Germany did not know we had one and didn't think we could raise one.

Capt. Hopkins was right when he said the universal recognition gained by persons like Miss Adams for their good works makes them all the more dangerous when they turn to doctrines of pacificism which no experience supports.

The National Guard Convention

[Reprinted from the *New York Times*]

The strength of the Guard last June was 177,525, a complement which could be raised to 250,000 if Congress added \$2,000,000 to the budget estimate of \$30,827,252. Last year Federal recognition of new units had to be denied. There were plenty of applications. Just enough money was available to maintain the Guard at a strength that had not varied for two or three years. The National Defense Act contemplates a round quarter of a million. As it has become necessary, for lack of funds, to reduce the regular army by several thousand non-commissioned officers and men, it would be the part of wisdom to appropriate a little more money for the Guard and increase it to the authorized maximum. The Guard of the post-war period is not far behind the regular army in training. In physical material it is superior. Without fear of contradiction it can be said that the infantry of the Guard is just about as fit as the regulars to go into the first line of defense.

Three years ago General George C. Rickards, Chief of the Militia Bureau, declared that it was "the best Guard we have ever had from any point of view." The Guard is even better today than it was then, probably in every state. One test is ability to mobilize. Ninety per cent of the New York National Guard would be ready in twenty-four hours after an emergency call. Every officer knows what he would have to do, from the Major General commanding to the squad leaders. Travel schedules have been elaborately worked out. Officers were schooled for more than a year before General Charles W. Berry, in the summer of 1924, could confidently say that a summons from the Governor would bring 90 per cent of the troops out in a single day, prepared for active service. The Guard has profited by its relations with the regular army and improvement of equipment. Only last June the Connecticut Guard was called out at 4 o'clock P. M. by Governor Trumbull, and in a few hours from 73 to 92 per cent of the rank and file assembled in the armories. Most of the absentees were away from home when the call came.

PROFESSIONAL NOTES

Increasing the Strength of Divisional Artillery for Major Actions in the War of Movement and in Retreat

By BARON VON WEITERSHAUSEN, formerly Colonel, German Army

[Translated from *Militär-Wochenblatt* by COLONEL GEORGE RUHLEN, U. S. Army, Ret.]

In my former article (*Militär-Wochenblatt*, No. 18, 1926) I presented my views of the normal composition of the division artillery. I now desire to talk about the reinforcement or increase of strength that the division artillery must receive for major actions in which it may be engaged. The number and kinds of batteries will naturally vary with the work that may fall to the division: it may be standing in the focus of the decision, a side attack may have been assigned to it, it may find application as a division in second or third line. The question of fixing the number and kinds of batteries is not taken up here for each particular case; that involves too many possibilities, but it is a question of determining what are the limits and calibers taught us by war experience.

The wearisome trench warfare gave rise to an enormous accumulation of firing material for the attacking as well as for the defending side. Such preparations for a battle could, if given timely attention, be arranged by both sides. Enormous masses of ammunition were stacked up, reserves of firing material were prepared, and every spot of ground adapted for a battery emplacement was utilized. One could count on 60 to 70 batteries for a division sector of from two to three kilometers in width and on 30 to 40 light and 20 to 30 heavy batteries with an average expenditure of ammunition in a fighting day of major action of 2000 rounds for each light and 1000 to 1500 for each heavy battery, 200 to 400 for each mortar and 300 to 600 for each 10-cm. gun battery. Unless quite revolutionary phenomena in the domain of gun construction make their appearance, one may have to reckon with that rate of expenditure for his artillery establishment in a future war. Directing the fire of such a large number of batteries causes no difficulties. Detailed special reports of observations are at hand before the battle begins that make it possible to determine the distribution of large firing aggregations into batteries: for the infantry, for fighting the hostile artillery for harassing fire at long range, and for reserve, all at the direct disposition of the artillery commander. There will be a question of firing by charts under conditions of painstaking determination of battery stations and range finding for barrage firing. The first and principal aim for the attacking as well as for the defending artillery is overcoming and demolishing infantry resistance, with special reference to that of the attacking lines. The entire artillery must at times be applied to that purpose. In addition it is an important part of the artillery batteries to hold down the fire of enemy batteries. One cannot concern oneself with totally demolishing them. As far as possible the most annoying of them should be destroyed beforehand. Thus it may be hoped that they have not fully recovered their full firing capacity on the day of the battle. The destruction of permanent emplacements, strong concrete works, and armed turrets with heavy-caliber guns must be accomplished before the major fight begins. Thus it will come about that the mass of the heavy guns will belong to the

group for fighting against infantry. The heavy field howitzer is the principal fighting gun for that purpose; about five batteries of 21-cm. mortars should be sufficient for the extent of front above mentioned. In round numbers twenty light batteries to dominate the fire of the heavy artillery also belong to this group to hold their fire in motion in depth and laterally and, by scattering gas shells round about him, compel the opponent to put on gas masks. The remainder of the light batteries and the long guns of the heavy artillery belong to that allotment designed to hold down the fire of the enemy artillery. This will, as a whole, involve twenty to twenty-five batteries of which ten to fifteen will be light. They will carry on the gas fighting principally to hold down or completely control the fighting activity of enemy artillery. It is indispensable that the medium and heavy minenwerfers shall be dispersed throughout the artillery firing spaces and placed under the direction of the artillery commander. Finally, the artillery commander must have under his control a number of bombing squadrons in a major action, at any rate at the focus of the battle. The work assigned to them will be: demolition of approaching ammunition transports and troop units, destruction of annoyingly posted separate batteries, and, finally, application of surprise effect at the focus of the battle area at the moment of decision. Unfavorable weather conditions may of course render it necessary that the artillery take upon itself those functions. Otherwise those are the duties that devolve upon the bombing squadrons which can execute them better than could the artillery, which depends upon balloon and phone observations in all work of that description. The infantry gun batteries and tank guns remain independent of the general artillery direction. The latter operate within the circuit of their tank units. Both receive instructions from the infantry commander to whom they are assigned.

One cannot, of course, haul along such a mass of artillery impedimenta in a war of rapid movement. According to my war experience the artillery can, in that case, be increased up to thirty to thirty-five batteries at the utmost. That would then become, with a normal force of twenty batteries, a reinforcement of twelve to fifteen batteries. They would be made up, in round numbers, of six light gun and six to nine heavy field howitzer batteries. Even that number renders movement difficult and increases length of the marching columns to an undesirable extent. In order to obviate a part of those difficulties I placed a light detachment at the end of a division which marched along as a second echelon to a certain extent. I placed it in rear of the entire artillery during the fight also, and laid their fire to dominate the enemy's most advanced fighting line at long range on account of their greater distance and also used them as a second artillery line in case of a reverse. It is quite manifest that the assignment of bombing squadrons to the artillery commander will become a most urgent necessity in a rapidly advancing war of movement. They can accomplish numerous tasks more quickly and more securely than could the artillery alone. One may also come to the conclusion, in many cases, of replacing the whole or a part of the increase of artillery with bombing squadrons in order to facilitate the mobility of the division. This would apply especially in the retreat. If one wants to send reinforcements to the division artillery for that purpose it must comprise only light and medium flat-trajectory fire. Whatever is needed for annihilating fire is provided by the heavy batteries of the normal equipment. Retreat always calls for fighting at long ranges in order to render retirement in echelon practicable; that requires long-range gun batteries. The question of numbers involves three and at most times six batteries. Too many batteries make the entire affair unwieldy and are detrimental to rapid change of positions. Here we must be governed by the fundamental principle: few batteries but much ammunition. That must be stacked up in great quantities along the route of the retreat; whatever is not used will have to be lost. Gas ammunition is the demand of the hour.

A Problem

The JOURNAL would like to have some of its mathematically inclined readers submit a solution to the following problem.

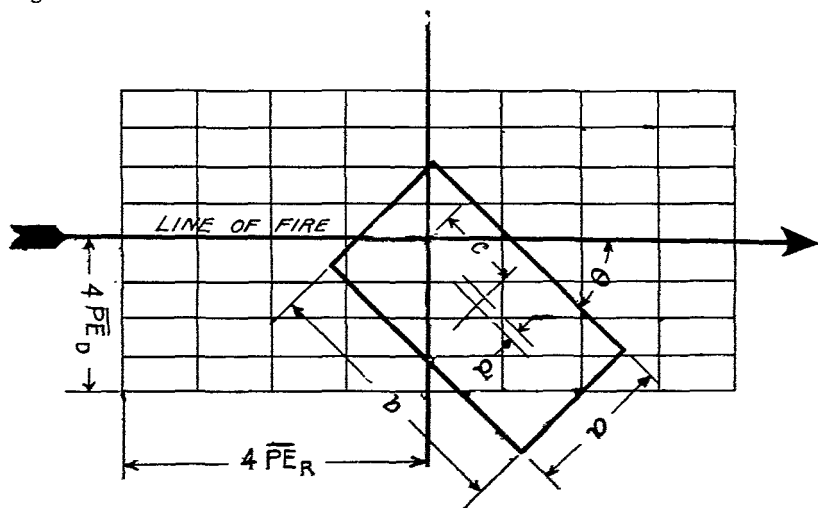
Given: A rectangular target whose sides are inclined to the axes of the 100% dispersion zone rectangle, lying anywhere in the 100% zone.

Dimensions of:

- (1) Target: Width = a .
Length = b .
Distance parallel to side b from center of 100% zone to center of target = c .
Distance parallel to side a from center of 100% zone to center of target = d .
Inclination of side b to line of fire = θ .
- (2) 100% zone rectangle:
Length parallel to line of fire = 8PER = 8 probable errors in range.
Width perpendicular to line of fire = 8PED = 8 probable errors in deflection.

To find:

Analytically (not graphically) the percent of hits which should be made on the target.



Battery E. 63d Coast Artillery, U. S. A., is most Efficient Unit

Battery E, 63d Coast Artillery (Antiaircraft), U. S. A., 2d Lt. Wayne L. Barker, commanding, of Fort Winfield Scott, Calif., has been rated by Major R. R. Welshmer, regimental commander, the most efficient battery in the regiment. The rating carries with it a silver loving cup and a general efficiency streamer, both of which were presented to the battery with appropriate ceremonies at a recent date.

This battery using eight model 1917 Browning machine guns in a problem at Santa Cruz, Calif., during the maneuvers of the 63d recently, secured 328.8 hits out of a total of 8015 rounds fired; fired at the rate of 3250 rounds per minute, securing 133.1 hits at the same rate of speed. A record. The average slant range was 2400 feet.

This battery has been not only able to hit the target consistently throughout the firing, but their record in this practice eclipses anything they have ever done before, in fact, so far as known, this is the best record that has ever been made against aerial targets by machine gun fire, according to Major Welshmer.

Second Lt. Grayson Schmidt, the only other commissioned officer with the battery, is the inventor of a special sight for use on the new 50 and old type 30-caliber machine gun. Lieutenant Schmidt actually manufactured this sight during the maneuvers and its exclusive use by the regiment in general and Battery E in particular resulted in an increase in effectiveness of this type of fire by 400 per cent.—*Army and Navy Journal*.

The United Service Increases Dividends

The January meeting of the Board of Directors of the United Services Automobile Association, after considering the results of operations for 1925, directed a substantial increase in the dividend payable to members. The new dividend rate will vary from month to month, as well as with the forms of protection carried. Most members carry Public Liability, Property Damage, and Fire and Theft. The dividends on these will average, under the new schedule 25 per cent of premiums paid.

The report of operations for 1925 shows the following items:

2496 Claims paid for total of \$52,148.39.

Direct cash saving to members (dividend checks issued plus premium discounts), \$46,874.23.

These savings are in addition to a surplus to the Policy-Holders, the joint property of the members, of \$50,393.52.

Catastrophe losses are completely guarded against by reinsurance treaties covering Public Liability, Fire and Transportation.

The Presidio of San Francisco

By CAPTAIN C. M. GALE, 30th Infantry.

In 1776, while the American Colonies on the Atlantic Coast were putting into effect the Declaration of Independence, the Spanish rulers of Mexico were sending exploring parties northward along the California Coast, establishing missions and military posts and taking possession of the country in the name of Spain. The northernmost of these posts was the Presidio of San Francisco, founded on the shores of San Francisco Bay, a body of water discovered by a Spanish exploring party seven years earlier.

At a point that is now in the center of the main post the Spaniards laid out their Presidio and immediately began the construction of a number of buildings, all, including the parade, being surrounded by a high adobe wall. The parade selected at that time is still the main parade of the post and one of the adobe buildings erected soon after is still giving service, being used as the Presidio Officers' Club. This building, a picture of which appears on the next page, has the distinction of being the oldest building in the City of San Francisco.

The Presidio continued to be used by the Spanish until it was taken over by the Mexicans when they gained their independence in 1822, and was garrisoned by the Mexicans until the United States took forcible possession in 1846.

As the native Indians if this locality were not warlike and no foreign power was feared the garrisons of all the Presidios throughout California were small. At no time during either the Spanish or the Mexican rule were there as many as fifty men permanently quartered at the Presidio of San Francisco. The rush for gold in 1848 and 1849, which changed San Francisco from a sprawling village of a few hundred persons

to a city if several thousands, placed the Presidio of San Francisco in an important position and the garrison was greatly increased. Since then the military value of the Presidio, both in times of war and in times of peace, has steadily increased until it has become one of our greatest army posts.

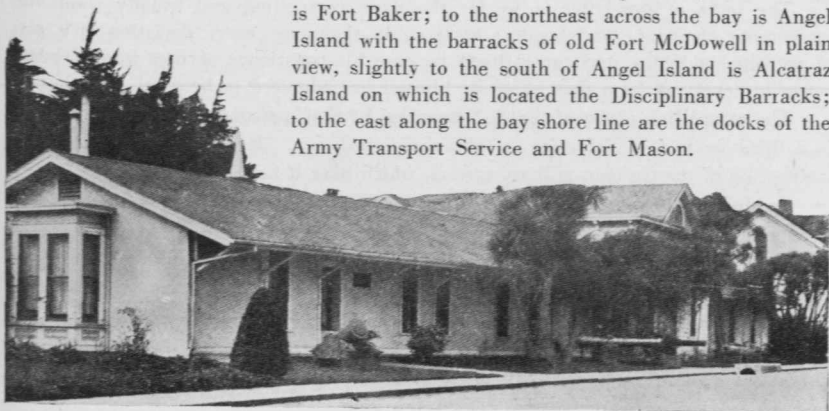
The Presidio reservation consists of about 1500 acres occupying the northernmost point of the Peninsula of San Francisco. The entire reservation originally consisted of nothing but bare sand hills and rocks and remained in that condition until large areas were planted with eucalyptus and pines about forty years ago. This, with the building of roadways and other general improvements has made the Presidio one of the beauty spots of San Francisco.

The reservation contains many points of interest; besides the Main Post, there are Fort Winfield Scott with its numerous coast defenses; Crissy Field with its landing fields and hangars and air mail depots; Letterman General Hospital, one of the largest of the Army hospitals; the Marine Hospital; Fort Point Light House and Coast Guard station; the National Cemetery, and spread over the central hills is the Presidio Golf Course, fast becoming one of the finest in the country. The Panama-Pacific Exposition occupied a portion of the Presidio grounds and the Fine Arts Palace, the only building remaining from the Exposition, is in use as an Art Museum.

The Presidio Post proper occupies only a small portion of the reservation and is itself divided into several distinct areas. Spreading over the neighboring hills fan-shaped from the Main Post are in turn: East Cantonment, now the home of the Third Division Trains; West Cantonment, occupied by the School for Bakers and Cooks, and the Signal Corps; and Infantry Terrace, from where the quarters of the Infantry Officers look down on the Bay. In the brick barracks of the Main Post are quartered the Thirtieth Infantry, commanded by Colonel Thomas A. Pearce. Nearly all the special branches of the service are represented by detachments at the Presidio, most of these being units of the Third Division. The Post is under the command of Colonel William P. Burnham.

In a large three-story concrete building within the Main Post is located the Ninth Corps Area Headquarters, with Major General Charles G. Morton commanding.

Standing on the high hill of the Presidio one can see miles in every direction. To the south and east one looks down on the City of San Francisco; to the west can be seen the flag flying above Fort Miley and on beyond the Pacific Ocean with the Farrallone Islands far in the distance; to the northwest across the Golden Gate is Fort Barry, where the troops of the Presidio go for their rifle practice; to the north is Fort Baker; to the northeast across the bay is Angel Island with the barracks of old Fort McDowell in plain view, slightly to the south of Angel Island is Alcatraz Island on which is located the Disciplinary Barracks; to the east along the bay shore line are the docks of the Army Transport Service and Fort Mason.



Eighteenth Century Customs

Social life in Philadelphia in the years immediately before the Revolution and the adoption of the Declaration of Independence occupied much of the time of the inhabitants. Afternoon tea parties were much in vogue, and the popularity of those who attended these was gauged by their ability to make puns during the course of conversation. The punster of the eighteenth century was the equivalent of the "wise-cracker" of today.

In the latter half of the century the socially prominent residents began to give greater attention to their personal appearance than before. The use of tooth brushes became rather widespread, and the almost equally popular custom among the women of today, the arching of eyebrows, was given its first trial.

"Mrs. Holliday, wife of Joseph Holliday, tailor, in Arch street." reads an advertisement in a newspaper of this time, "offers her new-invented curious compound, which will, in half a minute, take out by the roots the hair that grows too low on the forehead, etc., or around the mouth; it forms the eyebrows that are too large into a curious arch. This compound is perfectly innocent and may be used on children under twenty months old."

In reading the old advertisement one cannot help but wonder what advantage it would have been to a child twenty months old to have its brows permanently arched into a "curious" look, or if it was a common thing at that time for a child of such tender months to "sport" superfluous hair about the mouth.

In 1769 there came to Philadelphia, according to another old advertisement, a Dr. LeMayour, a dentist, who proposed to transplant teeth.

"Several respectable ladies had them implanted," wrote Watson in his *Annals of Philadelphia*. "I remember some curious anecdotes of some cases. They were often two months before they could eat with them."

The Salute in the United States Army

By CAPT. C. A. S. FROST, C. A., Res.

A man willingly respects and obeys a rule of conduct prescribed for him by authority for one of two reasons, i. e., because he respects the authority laying down the requirement in question and hence is willing to follow it blindly, or because, by his own research and reason, he has established for himself that the rule is a good one, in which case the thing itself commands his respect and willing obedience.

The force of the latter is by far the more compelling and usually results in unswerving obedience and loyalty; at least, in that case, every deviation is a sort of punishment to the deviator in itself because his conscience accuses him of insincerity in departing from that which he himself has admitted to be good.

The compelling power of "force," meaning, by that, personal or physical strength, is a third method of enforcing or obtaining obedience. It was, first and last, the mainspring of the German military system, which gave it honored place.

In the American military school, "force" does not occupy this honored place; here a man from whom obedience must be forced is soon gotten rid of. On the contrary, the reasons I have first above outlined constitute the basic underlying idea of cohesive organization in the American army. It is the same, whether the "salute" or the performance of any other service or ceremony be involved.

The thought behind the military salute and the greetings that ordinarily pass current in civil life are essentially the same.

A civilian, meeting a friend or acquaintance, raises his hand, or his hat, or says "Good morning," because he sees before him a person for whom he has respect, perhaps admiration, or even affection, to whom he may owe a debt of gratitude or good fellowship; it may be his employer or employee.

Goodwill, equality of spirit (if not of outward station in life) and sincerity occupy the thoughts of friends who exchange such greetings; of which the raising of the hand or the spoken word is but the outward sign or symbol.

Greetings thus exchanged are, it is true, sometimes a mere show, to which the persons involved do not give their unqualified consent, as, for instance, between persons who bear some secret animosity toward each other; but that is rarely the case. The man who goes about secretly hating his fellows, below or above him in station, while extending his hand in greeting, is cursed by the consciousness of insincerity in his own mind. Sooner or later he is discovered by his comrades or acquaintances and rated accordingly.

Men in all walks of life who are engaged in a common service, fraternal, social, economic, or whatever the field of service, have their own fixed and peculiar forms of greeting, special hand clasps, signals, pass words, to denote their fellowship in common enterprise. Just another way of assuring each other on meeting that they are working together for the same thing, and acknowledgment of comradeship and respect. Society recognizes and conserves these things and is all the better for them.

So it is with the American military salute. It is an expression, an outward sign of pride of service, confidence therein and in each other, a courtesy that springs from the heart, an affirmation of loyalty to the common service and to the uniform worn by officer and enlisted man, of good will and good faith from one to the other.

Moreover the salute, as rendered, reveals the inner man.

An open and friendly look to the eye indicates honesty of purpose and intent, as well as fearlessness and manly pride. A smart and well executed salute denotes accuracy, sobriety, cleanliness. A company that develops it will be found to be an outfit that can be depended upon in the intent to carry out its mission and the ability to execute it with definiteness and dispatch.

There is no thought of servility in such a demonstration. However, the man who fails to grasp its good purpose and intent and who therefore renders his salute through fear of punishment or of applied "force" is a slave to his own mental reservations and limitations. That is the only "servility" there can be about it, and that only in case the individual is servile to his *own misconception* of an honored and noble custom in American military life.

The man, civilian or soldier, who ridicules or derides either, is merely making an open show to his fellows of his own ignorance and unfitness to observe the established customs of the social order to which he belongs.

Therefore the military salute is as much entitled to our adherence and respect as any method of formal greeting known to civilians; in fact, all such are alike deserving of understanding and observation among intelligent persons in any service.

Soldierly Pride

Of all the characteristics which an officer may possess, the one which it is most desirable to stimulate and most fatal to impair is that of legitimate soldierly pride. Ability for leadership, loyalty to superiors and to subordinates (and the latter is the more important in the long run), endurance of hardship and of disappointment, conscientious performance of duty and conscientious preparation for future duties—all spring from the fixed conviction that one is very greatly, and in some measure deserv-

edly, honored by having been entrusted with a commission in the Army of his country.

Self conceit and self-admiration are the opposites to legitimate pride. Both denote conscious or unconscious inferiority and a conscious or unconscious attempt to conceal this. Legitimate pride is seated deep in the heart and radiates such self-confidence that the possessor is without fear of facts or events. The officer who has soldierly pride in the ultimate degree is incapable of an unsoldierly thought or action. The Germans knew all about this and created a wonderful spirit of this kind in their officers; unfortunately the racial—or perhaps the imperial—temperament caused certain expressions of this to be inconsistent with the civilized idea of courtesy, not to say common decency. But the thing was there and its value was beyond question.

The cultivation of this spirit is a matter of atmosphere and tradition rather than of set procedure. A new lieutenant in the company of older officers who show by their behavior that they feel an intense pride in being officers and in performing their duties cannot escape the fortunate contagion. Words on the subject, whether written or spoken, must be as useless and as uncertain in their effect as much of the well-meant but poisonous drivel that was written and talked about morale some years ago.

Regrettably enough, it is far easier to impair the soldierly pride of an officer than it is to bring it into being or increase it. The continuous performance of duties which require meticulous accuracy and nothing else—which could be equally well done by a ten-year-old child—inevitably causes a deterioration of self esteem. True, bars of soap must be counted, and counted correctly, and Post Exchange accounts must be kept in order. But between the conception of turning a combatant officer into a supercargo or a bookkeeper and the conception of leaving important matters in the hands of other ranks whose position is such that it would be unfair to hold them wholly responsible, there must be some middle course. The value at one time attached to the signature of an officer was a tremendous source of inspiration. The thought that one's simple signature was accepted as absolute proof of the correctness and accuracy of what went before was a great incentive to care and a great source of self-respect.

Professional ignorance and the consciousness of a lack of professional judgment are strong bars to the development of pride and self confidence. The new school system—provided it does not go in for sterile competition between officers, with all the petty heartburnings consequent—will be a great influence for good. The cultivation of sound judgment, and this is certainly the principal business of the higher schools, is a step directly toward justified self confidence.

But pride is the thing. Discipline and habit played a part in holding the Regulars solid at the first Bull Run and the sailors at Bladensburg. Discipline and habit helped keep the British force intact during the retreat from Mons. But more than discipline, more than habit, and infinitely more than training, the thing that did the work was each man's pride in his organization and especially his pride in himself as a soldier and as a member of his organization and of the Army of his country.

MILITARY NOTES

furnished by

THE MILITARY INTELLIGENCE DIVISION, G. S.

Argentina

ARMY MANEUVERS FOR 1925.—We are so accustomed to looking to Europe or Japan for our studies of annual army maneuvers, in the belief that none such are attempted on the continents of the two Americas, that it may be of interest to find one country, Argentina, did conduct quite extensive maneuvers in October-November, 1925.

These maneuvers are the first that have been attempted in Argentina since 1914 and were designed to bring into practical use, on as large a scale as possible, the new tactics which were developed during the World War.

Some 14,000 troops took an active part in the maneuvers which lasted twenty days. The tactical organizations which were present consisted of five infantry divisions, two cavalry brigades and two mountain detachments aggregating:

- 14 Infantry regiments.
- 5 Cavalry regiments.
- 2 Cavalry regiments.

During the Division maneuvers all the troops were combined into a full strength division in which Infantry regiments were expanded into three battalions, and an artillery brigade of two regiments were formed. A skeleton detachment of all arms was formed, which the division operated against as an outlined enemy. At this time the various supply and transportation departments acted under one head.

During the maneuvers there was a well-organized system of umpires in which each Infantry regiment, or similar unit, had an umpire assigned to it. A small pamphlet was written prior to the maneuvers to be used as a guide, called "*General Instructions for Umpires.*"

In the Infantry the deployments were made in successive thin lines as taught by the lessons of the World War. Advances under fire were made at the last stages of an attack by successive small groups under a noncommissioned officer, and the leadership of these small units was well conducted. The arms employed were the rifle, automatic rifle, and machine gun, also the accompanying battery which belongs to the Infantry command of each division. The accompanying battery was used well to the front with the advanced lines, and in some cases so far to the front as to be captured.

The artillery was used well to the rear, choosing the reverse slopes with overhead fire.

Cavalry was used in all operations in reconnoitering and as dismounted Infantry.

At the beginning of the maneuvers there were 20 airplanes in all assigned to the maneuver camp. These planes were assigned in small groups of two or more to a side in the exercises. They were used entirely on reconnoitering.

During the maneuvers every effort was made to make as great a use of the Engineer troops as possible. Small streams, which could be easily waded, were bridged with pontoon bridges, and roads were repaired during the process of the maneuvers with the idea of giving as much training as possible to the Engineer troops.

The Communications troops which were furnished mostly by the Communications School were used in establishing telephonic communications between different units. The telephones had the single wire or ground circuit. Radio communication was established between headquarters and the different depots, and telegraphic communication was held between maneuver headquarters and the nearest post office.

France

GENERAL OFFICERS IN THE FRENCH ARMY.—France, with an active army of 33,474 commissioned officers and 651,985 enlisted men has 457 marshals and general officers, or a proportion of one general officer to each 73 officers or 1426 enlisted men.

The United States has 69 general officers or a proportion of one general officer to 171 officers or, 1808 enlisted men.

The French general officers are of three classes: the six Marshals of France, 140 major generals, and 311 brigadier generals.

Of the six Marshals of France:

2 are on the active list (Pétain and Franchet d'Esperey).

4 are on the retired list (Joffre, Foch, Lyautey, Fayolle).

6 Total.

The law requires that Marshals of France be retired from active command at the age of 70 years. All Marshals, even when retired to non-active appointments, receive full pay of their grade for life.

Marshals are in a special class by themselves and the senior by date of appointment is dean of Marshals during his lifetime. When retired to non-active commands they retain their place as Member of the Superior War Council (Conseil Supérieur de la Guerre).

Marshal Petain will reach retiring age—24 April, 1926.

Marshal Franchet d'Esperey will reach retiring age—25 May, 1926.

Names given in order of their appearance as Marshals:

- (1) Joffre (Joseph-Jacques-Césaire), born 12 January, 1852; 74 years old; Member of Superior Council of War.
- (2) Foch (Ferdinand), born 2 October, 1853; 73 years of age; Member of the Superior Council of War; President of Interallied Military Committee of Versailles.
- (3) Pétain (Henri-Philippe-Benoit-Omer-Joseph), born 24 April, 1856; 69 years old; Vice President and Member of the Superior Council of War; Inspector General of the Army.
- (4) Lyautey (Louis-Hubert-Gonzalve), born 17 November, 1854; 72 years old; Member of the Superior Council of War; recently relieved as Resident General of the Republic of France to Morocco.
- (5) Franchet d'Esperey (Louis-Félix-Marie-François), born 25 May, 1856; 69 years old; Member of the Superior Council of War.
- (6) Fayolle (Marie-Emile), born 14 May, 1852; 74 years old; Member of the Superior Council of War.

Major Generals of the French Army, with corresponding grades in the services.

By taking those actually in service 1 June, 1925, there are:

- 3 Major Generals maintained without age limit in the First Section and placed outside of cadres. Authorized under Art. 8 of law of 13 March, 1875.
- 1 Major General maintained exceptionally on active list beyond age limit under Art. 3 of law of 8 July, 1920.
- 100 Major Generals, General Staff, with metropolitan troops.
- 14 Major Generals, General Staff, with colonial troops.
- 6 Contrôleurs Généraux 1st Class = Major General of line grade in control of organization of Army Administration (Corps du Contrôle de l'Administration de l'Armée) corresponding to Major General of line.
- 6 Intendants Généraux, with metropolitan troops.
- 3 Intendants Généraux, with colonial troops.
- Grade in Supply Corps corresponding to Major General of line.
- 1 Inspecteur Général of Corps of Military Engineers for Powder.
- Grade in this service corresponding to Major General.
- 5 Médecins Inspecteurs Généraux, with metropolitan troops.
- 1 Médecin Inspecteur Général, with colonial troops.
- Medical Corps grade corresponding to Major General of line.
- 140 Total Major Generals and corresponding grades.

THE EFFECTIVES AND THE MEANS OF COMBAT OF THE LARGE UNITS ...

Units	Division of Infantry	Division of Cavalry	Army Corps		
			of 2 Div.	of 3 Div.	of 4 Div.
Officers	470	370	1,260	1,730	2,200
Enlisted Men	16,650	9,400	32,300	48,950	65,600
Horses	5,700	8,000	15,500	21,200	26,900
Animal-drawn vehicles	1,400	800	3,480	4,900	6,280
Touring Cars	38	50	120	160	200
Trucks and light trucks	120	150	510	640	756
Automatic Rifles	341	315	707	1,048	1,389
Machine guns	172*	104*	355	527	699
Cannon, 37-mm.	9	36**	18	27	36
Stokes Mortars	9	3	18	27	36
Cannon, 75-mm.	36		72	108	144
Cannon, 155 short ..	24	24	48	72	96
Cannon, 105-mm.			24	24	24
Cannon, 155 long			24	24	24
Airplanes			10	10	10
Balloons	1		3	4	5

*These include the machine guns of the Artillery.

**These are the 37-mm. guns with the three armored car squadrons of the division.

Italy

COMPETITION FOR OBTAINING AIR PILOTS.—The Italian Air Ministry, in an effort to obtain an adequate number of airplane and seaplane pilots for the new squadrons now in course of formation, has opened a competition among young men between 20 and 26 years of age who intend taking piloting courses. These boys, aside from possessing the necessary physical requirements, must be of good character, excellent

conduct, and well educated. Grammar school certificates are required. The number of entries, as established by the Air Ministry, is 400. The boys will be assigned, after successfully passing their examinations, to the different private piloting schools where they will take the regular courses for airplane or seaplane pilots in accordance with the rules at present in force. They must sign for a period of enlistment of six years.

On leaving the schools, after passing successfully the required number of tests in piloting, they will be appointed sergeants in the air force (Aeronautical Arm) and will get the brevet of airplane pilots; they will then be detailed to the squadrons where, after a period of additional training with military machines, they will obtain the brevet of military pilots.

RATION OF THE ITALIAN SOLDIER.—The daily ration of the Italian Soldier is as follows:

<i>Article</i>	<i>Quantity</i>	<i>Value</i>	
		1925-26	1926-27
Bread	700 grams	Lire 1.60	Lire 1.60
Beef, fresh or frozen	200 "	1.50	1.60
Macaroni, various	180 "	0.432	0.60
or			
Rice	150 "	0.15	0.165
Dried vegetables	50 "		
or		0.31	0.34
Potatoes	100 "		
Coffee, roasted	10 "	0.105	0.11
Sugar	15 "	0.105	0.18
Lard or oil	15 "	0.052	0.065
Tomato paste (concentrated)	15 "		
or		0.01	0.01
Fresh tomatoes	100 "		
Salt	20 "	0.165	0.21
Cheese, grated (daily)	10 "	0.20	0.25
Spices, onions, garlic, fresh vegetables, etc., to improve the ration	20 centimes		
Occasional increase			0.07
Total		4.50	5.20

N. B.: 453 grains = 1 lb. Value of lire about 4 cents.

The bread ration is increased one-fourth, the beef ration 50 grams, and the macaroni or rice ration 20 grams for those troops on maneuvers or on duties which take them away from barracks for two or more days.

No government will be disposed to violate our rights if it knows that we have the means and are prepared to defend them.—*James F. Monroe.*

COAST ARTILLERY BOARD NOTES

Communications relating to the development or improvement in methods or materiel for the Coast Artillery will be welcome from any member of the Corps or of the Service at large. These communications, with models or drawings of devices proposed, may be sent direct to the Coast Artillery Board, Fort Monroe, Virginia, and will receive careful consideration. R. S. ABERNETHY, Colonel, Coast Artillery Corps, President Coast Artillery Board.

Projects Initiated During the Month of January

Project No. 430, Universal Spotting Device for Coast Artillery Use.—In Letter OCCA 665/BZ1, dated December 22, 1925, the Coast Artillery Board was directed by the Chief of Coast Artillery to construct a spotting instrument or device along the lines laid down in Coast Artillery Board Project No. 416, *General Spotting Requirements*. This is now undergoing study.

Project No. 431, Test of Stereoscopic Range Finder for Antiaircraft Machine Guns.—This study was directed by the Chief of Coast Artillery in 1st Ind., OCCA file 413.682/L-1, dated December 19, 1925. The Coast Artillery Board has under study a 50-cm. B. & L. Stereoscopic Range Finder and an effort is being made to secure an 80-cm. coincidence type range finder for comparative test.

Project No. 432, Devices and Methods for Single-Station System of Sound Location by Antiaircraft Artillery.—OCCA File 477.12, December 19, 1925. Several plotting devices and systems of data determination for setting searchlights by the aid of sound locaters are being studied.

Project No. 433, Machine-Gun Ammunition Carrier Pack.—A device for carrying machine gun ammunition boxes suspended by slings from the shoulders, leaving the hands free. Now under test by 61st Coast Artillery.

Project No. 434, Modified Impact Board.—Of Coast Artillery Board origin. This is a modification of the Impact Board described in Par. 41, T. R. 435-221, and permits of spacing points representing corrections and deviations according to time and provides a permanent record of the fire adjustment.

Project No. 435, Improved Powder Tray.—Submitted by Captain A. C. Chesledon, 59th Coast Artillery. This is a device for loading and ramming powder sections directly from ammunition trucks.

Completed Projects

Project No. 425, Modified Range Correction Board, Model 1923

I—HISTORY OF THE PROJECT.

1. In considering Coast Artillery requirements for Range Correction Boards, Model 1923, it occurred to the Coast Artillery Board that this Range Correction Board could be modified so as to accomplish everything accomplished by the unmodified Range Correction Board, Model 1923, and to be less costly and cumbersome than the unmodified Range Correction Board, Model 1923. Accordingly the Coast Artillery

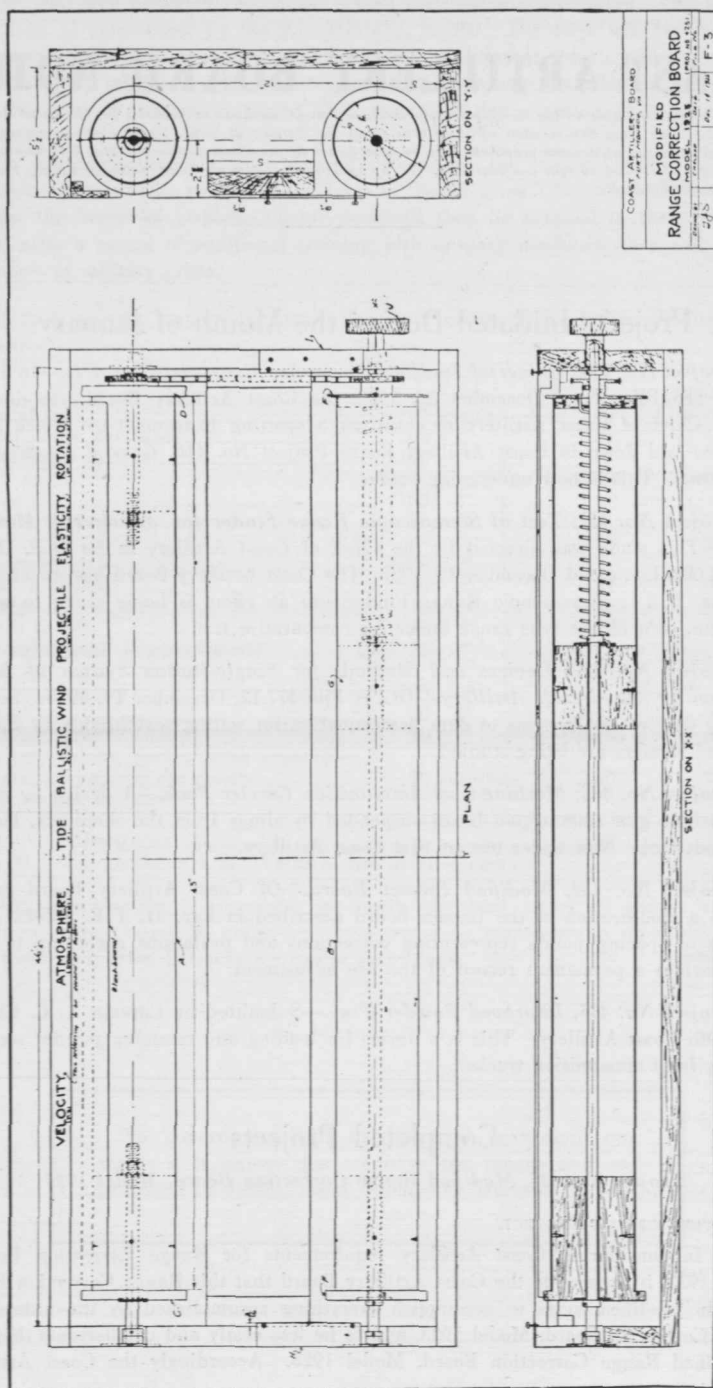


FIG. 1

Board designed the modification of the Range Correction Board, Model 1923, described in this project. Hereafter this modified board is referred to as the Modified Range Correction Board, Model 1923.

II—DISCUSSION.

2. *Construction.* The construction of the Modified Range Correction Board, Model 1923, will be understood from Fig. 1. The device consists essentially of a shallow wooden box in which are mounted two rollers; the axes of the rollers being parallel and separated by 12 inches. Roller A has rigidly fastened to each end a flange. Flange D at the right end of roller A has attached to it a sprocket. Roller B has rigidly fastened to its left end a flange E which is free to rotate on the axle of roller B. Within roller B there is a cylindrical block G, which is rigidly fastened to roller B but is free to revolve on axle of roller B. Flange F is fastened to axle of roller B and has attached to it a sprocket. A coil spring is placed on axle of roller B. One end of this spring is attached to block G and the other end to flange F. The two sprockets are connected by a chain. A removable handle is provided by means of which axle of roller B can be turned. Attached to ends of box are two brass strips H and I to which the ruler is clamped. A wooden guide extends from end to end of the box under the strips H and I. The range correction charts, joined together in one long strip, pass from one roller between the ruler and the guide bar to the other roller. A blackboard extends across the top of face of box and provides a place where reference numbers may be noted, each above the set of curves to which it pertains. It is to be noted that all surfaces of the box are flush, when the ruler is removed, except for the stop screws in the strips H and I. Thus the ruler can be removed in a few seconds time and the box prepared for a move by the application of a flat cover, this cover being countersunk to set over the stop screws. A packing box to carry the ruler can readily be made by battery mechanics. Such a box for the ruler, whether used with this or other modifications of the Range Correction Board is desirable. Plain cylindrical rollers are all that are required; no mechanical means of attaching charts to rollers need be provided.

3. *Rulers.* The same ruler as employed with the Range Correction Board, Model 1923, or the Pratt Range Board is used without any further modification with the Modified Range Correction Board, Model 1923. The ruler is simply clamped to the strip H and I.

4. *Charts.* a. *Kind:* The same range correction charts as employed with the Range Correction Board, Model 1923, or with the Pratt Range Board are used with the Modified Range Correction Board, Model 1923. The Modified Range Correction Board, Model 1923, can carry at one time all of the charts necessary for any one battery. On some of the charts it may be necessary to number the curves at more frequent intervals than at present; this, however, presents no difficulty.

b. *Mounting:* The charts to be used are made into one long strip by glueing the top of one chart to the bottom of another. Around each roller is glued a piece of heavy paper, 6-inch flaps being left to which to attach ends of strip of charts. The bottom of chart at bottom of strip is then glued to the flap on roller B and all charts then rolled up on this roller. Then roller B is held to keep it from revolving and the flange F is turned by means of removable handle until the spring connecting flange F to block G is under sufficient torsion to keep the charts properly taut after the top of the top chart of the strip shall have been attached to the flap on roller A. The top of top chart is now glued to flap on roller A and strip is rolled onto roller A until about three turns of paper are on that roller, and the device is set aside to let the glue dry. It is possible with the blue printing machine in the laboratory at Fort Monroe to print upon one strip of blue print paper (or cloth) all of the range cor-

rection charts required for any one battery. Blue print cloth is so far superior to blue print paper that it should be the ideal material for charts for either modified or unmodified Range Correction Board, Model 1923.

5. *Operation.* a. Adjustment of ruler: The ruler is adjusted readily to bring it parallel to the range lines of any chart simply by loosening the clamping screws and swinging one end of the ruler the necessary amount and then tightening the clamping screws.

b. To bring proper range line opposite ruler: The proper chart is brought under the ruler by turning flange F by means of removable handle; then the operator turns roller B by means of the flanges E and F until the proper range line is set. With the Modified Range Correction Board, Model 1923, the ruler remains fixed and the chart is moved as the range changes. The charts are easily moved by means of flanges E and F and when a range line is set opposite the ruler there is no tendency for the chart to move. This is due to the method of positively connecting the roller flanges by means of a chain and sprockets and connecting flange F to roller B (through block C) by means of a spring. The charts are under constant tension, can be moved readily, yet have no tendency to move or creep.

c. Position: The Modified Range Correction Board, Model 1923, is designed to be operated in a vertical position, in a horizontal position, or in an inclined position, dependent upon the facilities available. The Coast Artillery Board believes that the inclined position is most advantageous, as, in general, the board will be lighted best in this position and this is the most convenient position for the operator. The fact that the ruler is stationary simplifies the problem of lighting and facilitates operation in that the operator is not required to make such changes of position as are required in operating either the Range Correction Board, Model 1923, or the Pratt Range Board.

6. *Model.* A model of the modified Range Correction Board, Model 1923, was constructed under the supervision of the Coast Artillery Board. It differs from the device shown in Exhibit "A" only in that the ends of the model were not made flush and that permanent handles were attached to each roller. The rollers of the model were made of down-spout pipe, four inches in diameter, made of galvanized sheet iron.

7. *Test.* The model was tested by the Coast Artillery Board. Seven range correction charts were mounted on the model. The charts were all rolled upon one roller and then upon the other a sufficient number of times to demonstrate that there is no tendency of the charts to ride the flanges. The top of one chart was brought opposite the ruler. This chart was moved until the bottom was opposite the ruler and then moved back to its first position; this cycle was repeated 1100 times, the chart being moved at a much higher rate of speed than would be the case during drill or service. The Coast Artillery Board is of the opinion that the life of blue print charts on the Modified Range Correction Board, Model 1923, will be as long as on the Pratt Range Board and longer than on the Range Correction Board, Model 1923. The model was afterwards tested during drill by Battery C, 12th Coast Artillery, at *Battery Anderson*, 12-inch Mortars. The model was transported to and from *Battery Anderson* in the back of a Chevrolet runabout; and can be carried by one man. The device functioned perfectly during the test. Its operation was found to be easier than that of either the Range Correction Board, Model 1923, or the Pratt Range Board. Owing to the relative positions of guide, chart, and ruler there was found to be less chance of parallax errors with this device than with the Range Correction Board, Model 1923, or the Pratt Range Board. No defects were brought out by the test.

8. *Cost.* The Coast Artillery Board, while unable to estimate the cost of constructing the Modified Range Correction Board, Model 1923, at an arsenal, is of the opinion that the cost would be less than the cost of manufacturing the Range Cor-

rection Board, Model 1923, or of modifying the Pratt Range Board to Range Correction Board, Model 1923, for the following reasons:

a. The rollers in the Modified Range Correction Board, Model 1923, being mounted within the box and separated by but twelve inches, no mechanical method of clamping charts to rollers being required and no method of clamping rollers being required, it should be possible to employ less elaborate construction and less expensive materials in its construction than employed in the construction of the Range Correction Board, Model 1923, or the modification of the Pratt Range Board.

b. The lessened cost of packing and shipping the Modified Range Correction Board, Model 1923, as compared to the Range Correction Board, Model 1923, or the parts necessary to modify the Pratt Range Board, should largely offset the cost of the box of the Modified Range Correction Board, Model 1923. *Note:* The ruler has not been considered under this head as the same ruler is interchangeable among the three boards.

9. *Mobility.* The following comparison shows that the Modified Range Correction Board is much more compact and much more easily moved than the Range Correction Board, Model 1923, or the Pratt Range Board.

	<i>Modified Range Correction Board, Model 1923 (including cover)</i>	<i>Range Correction Board, Model 1923</i>	<i>Pratt Range Board</i>
Height, inches	19	49	41
Width, inches	48	52	48
Depth, inches	7¾	5½	5½

The ruler, being interchangeable is not considered in the above comparison. A flat cover to cover the face of the Modified Range Correction Board, Model 1923, and a case for the ruler should admirably adapt this device to the use of a mobile battery.

10. *Advantages.* The Modified Range Correction Board, Model 1923, possesses the following advantages:

a. It can be operated in a vertical, horizontal, or inclined position, and thus make best use of light available.

b. It is more compact than either the Range Correction Board, Model 1923, or the Pratt Range Board.

c. It is easier of operation than either the Range Correction Board, Model 1923, or the Pratt Range Board, as the chart is more readily moved than is the ruler and the operator is not required to change position during operation.

d. Provided with a simple cover and with a case for the ruler, it can readily be transported by a mobile battery.

e. There is less chance of parallax error than with the Range Correction Board, Model 1923, or the Pratt Range Board.

f. It employs the same ruler and charts as do the Range Correction Board, Model 1923, and Pratt Range Board; therefore it involves no changes other than those of mechanical construction and the moving of the chart instead of the ruler as the range changes.

g. It should, owing to its design, cost less than to manufacture the Range Correction Board, Model 1923, or to modify the Pratt Range Board to the Range Correction Board, Model 1923.

h. The blackboard at top of face of the board, upon which the operator notes the proper velocity and reference numbers with chalk, makes unnecessary the practice

of sticking pins into the charts. This latter practice has become necessary at mortar batteries when using any set of curves other than that at the top of the chart.

i. Should it ever become necessary or desirable to increase the vertical scale of the range correction charts, such change can be made by constructing the proper charts and mounting them on the rollers without in any way modifying the device.

11. *Disadvantages.* Due to the different locations on different charts of the various sets of curves it is impractical to apply once and for all the headings above the blackboard. However, these headings can be applied easily at any battery to suit the charts used by that battery. A strip of paper with the proper headings lettered upon it can be glued above the blackboard without difficulty. The Coast Artillery Board has been unable to discover any other disadvantage in the device.

III—CONCLUSIONS.

12. The Coast Artillery Board is of the opinion:

a. That the Modified Range Correction Board, Model 1923, is superior to the Range Correction Board, Model 1923, and is satisfactory as a standard for Coast Artillery use.

b. That, if adopted, the Modified Range Correction Board, Model 1923, should be provided for the following armament in the ratio of one for each plotting board supplied:

- 16-inch guns,
- 16-inch howitzers,
- 14-inch railway guns,
- 14-inch fixed guns,
- 12-inch guns of Barbette Carriage, Model 1917,
- 12-inch railway guns,
- 8-inch railway guns,
- 240-mm. howitzer (fixed emplacement),
- 12-inch mortars (fixed or railway),
- 155-mm. guns.

IV—RECOMMENDATIONS.

13. The Coast Artillery Board recommends:

a. That a limited number of Modified Range Correction Boards, Model 1923, be constructed by the Ordnance Department and subjected to service test.

b. That the Ordnance Department be requested to furnish estimates for manufacturing the Modified Range Correction Board, Model 1923, in lots of 10, 50, and 100, exclusive of cost of rulers.

c. That no further Range Correction Boards, Model 1923, be manufactured or Pratt Range Board be modified to Range Correction Boards, Model 1923, pending results of service test of the Modified Range Correction Board, Model 1923.

d. That the model of the Modified Range Correction Board, Model 1923, which the Coast Artillery Board has constructed be shipped to Frankford Arsenal.

A Nation cannot call upon any higher power to
protect it, but must defend itself.—*Charles F. Dole.*

COAST ARTILLERY SCHOOL LIBRARY

BOOKS CATALOGUED

Unless noted thus " * " these books may be obtained by any Regular Coast Artillery Officer; Warrant Officer, A. M. P. S.; or Non-Commissioned Officer (Grades 1-3), C. A. C., upon request to the Librarian, C. A. S. Library.

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- Botta, C. G. G. *History of the War of the Independence of the United States of America*. 2d ed. 1826. 2 v.
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- Bulow, A. H. D. *Historie de la Campagne de 1800*. 1804. 290 pp.
- Bullen, F. T. *The Cruise of the Cachalot*. 1899. 2 v.
- Bywater, H. C. *The Great Pacific War; a History of the American-Japanese Campaign of 1931-33*. 1925. 317 pp.
- Campbell, N. *Napoleon at Fontainebleau and Elba*. 1869. 398 pp.
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A strong democracy, always prepared to defend itself against attacks from without or within, would be less exposed to international provocation by critical or jealous governments, and less liable to the occasional internal panics which are apt to cause wastes and other unnecessary evils.—President Charles W. Eliot of Harvard.

BOOK REVIEWS

Leaves from a War Diary. By Major General James G. Harbord, U. S. Army, Ret. Dodd, Mead & Co., New York. 1925. 6½"x 9". xiii + 407 pp. with Index. \$5.00.

General Harbord's reputation for brevity and his requirements for terse, concise reports, make this diary rather a surprise as it becomes quite loquacious at times. Entries were not made daily nor regularly, but rather when time for reflection and writing followed incidents of special interest. The great irregularity of entry and the variety of treatment cause the reader to wonder whether much may not have been deleted in the editing.

The book covers the period from the embarkation of "The Pershing Party" to the signing of the Armistice and relates experiences as Chief of Staff of the Amex-force, Brigade and Division Commander, and finally as C. G., S. O. S. The book has not the literary qualities of Hamilton's *Staff-Officer's Scrap Book*, the human elements of Callwell's *Experiences of a Dug-out*, or the mass of new information of Dawes' *Journal of the Great War*, though it shows throughout the same whole-hearted and inspiring admiration of General Pershing and true loyalty to him that one finds in the latter volume. The reactions of the professional soldier are everywhere in evidence. One finds passages ranging from bromidic descriptions of routine events to valuable bits referring to field operations or racy gossip of people, many of whom one knows at least by reputation; all give a delightfully frank treatment. The book inspires one with the desire for high command in the hope of somewhat similar opportunities and experiences if the emergency should arise. One sees the writer in all activities and moods, in recreation as well as at work, disappointed and displeased over the outcome of some undertakings, expectant and hopeful at the outset of others, and betimes thoughtful, buoyant and reminiscent. At the close of his delightful discussion of the Armistice period, one feels he has seen much of the personal side, and little of the official side, of General Harbord.—C. D. Y. O.

Commanding an American Army. By Major General Hunter Liggett, U. S. Army, Retired. Houghton-Mifflin Company. 1925. 6"x 9". 208 pp. \$2.00.

An excellent presentation of an able and distinguished soldier's recollections of the World War. General Liggett was the great outstanding American commander of troops in the field. During the World War he commanded the I Corps and the First Army which contained at one time or another every combat division in France. He commanded the first American Corps to engage in battle in France under American High Command at the Second Battle of the Marne, and later his I Corps took part at St. Mihiel and in the Meuse-Argonne under his command.

During the last weeks of the war he commanded the First American Army, a force of more than a million men, the largest Field Army in the world and later he commanded the American Army of Occupation on the Rhine.

He therefore speaks with authority, and his story is told in a simple, clear, straightforward style singularly lacking in the use of the personal pronoun.

The first chapter deals with the years 1914-1918 and succeeding chapters take up the operations of the I Corps in its campaigns and the First Army in the Meuse-

Argonne. The last two chapters cover the Army of Occupation in Germany and "Some Thoughts on Military Matters."

While this book is written from the view point of the high command, it so clearly and simply describes the campaigns in which our force participated that it should be of interest to all officers of the Army.—W. W. H.

The Naval History of The World War. (The Stress of Sea Power 1915-1916). By Thomas G. Frothingham. Harvard University Press. 1925. 8½"x 5¾". 342 pp. \$3.75.

This is the second volume of the series foreshadowed in the review of the earlier work published in the December, 1924, issue of the JOURNAL, and does more than fulfill the promise of the preceding volume.

The greatest Naval event recorded is the Battle of Jutland, and here Captain Frothingham has been most successful. His account is full, clear, and, without sacrifice of technical accuracy, easily comprehensible to the non-military reader. This reviewer believes no better has been published, and that the conclusions are so illuminating and so sound as to demand extensive quotation.

In this situation there cannot be found any possibility of a German victory that would have destroyed the British Battle Fleet. But this situation essentially must mean that an opportunity was presented to the British for destroying the German Battle Fleet. Such a victory for the British would have accomplished the destruction of the whole fighting force of the German Battle Fleet. Yet, instead of anything of the kind, the overmatched and slower German Fleet was enabled to return to port, after inflicting losses much heavier than it had sustained. Herein lies the tragedy.

* * * * *

But, * * * it still must be held that the whole British fighting force was concentrated against the enemy by 6:30 p. m., at the latest. This left a good two hours of available daylight—and the German fleet speed was only 17 knots. Yet the British Fleet did not close the German Battle Fleet.

* * * We are forced to the conclusion that there was an opportunity for the British to win a decision, but the British lost that opportunity because they were not ready with methods for closing an enemy who was prepared for evasion in smoke screens, with threats of torpedo attack. As has been shown, the British entered the battle imbued with a preconceived caution in closing a withdrawing enemy. This cautious policy, as has also been shown, had been approved by the British Admiralty for "the conduct of the Fleet in action," and its ill effects should not be solely charged against the men who were fighting the battle. But the result of this British caution in closing was that Admiral Scheer was enabled to gain the protection of darkness—and at darkness the British Fleet withdrew from the battlefield. This sums up the essentials of the great naval action.

As to the effects and consequences of the battle, there is no question of the fact that this withdrawal of the British Battle Fleet from the battlefield had a great moral effect on Germany. Morale was all-important in the World War, and the announcement to the people and to the Reichstag had a heartening effect upon the Germans at the very time they needed some such stimulant, with an unfavorable military situation for the Central Powers, and as an offset to the irritation of the German people at being forced to abandon the U-boat campaign upon the demand of the United States.

When we consider the indecisive tactical result on the battlefield, the Battle of Jutland cannot be said to have caused any immediate change in the broad situation which then existed on the seas. The claim was made that the Germans had so maneuvered their Battle Fleet that detached forces of the superior British Battle Fleet were cut up. But this damage was not enough to do away with the established superiority of the British Battle Fleet, which still remained in control of traffic through the North Sea. After Jutland, as before the Germans were barred from the waterways of the world. None

of their ships was released from port, and there was no effect upon the blockade. These facts were cited at the time in Great Britain to show that the "defensive" use of the British Fleet had maintained the Allied supremacy on the seas, and that Jutland had the effect of a victory.

But this was a fallacy, on its own statement, because preserving the existing naval situation unchanged also preserved the German control of the Baltic, which has been shown to be the worst drawback for the sea power of the Entente Allies.

Throughout the text the changing Naval situation is well presented and the writer's conclusions seem sound except in some parts of his study of the situation on land as affecting the Naval situation. The Land and Naval operations in the Dardanelles campaigns are well handled throughout.

The history of the development of the submarine campaign against commerce is another outstanding achievement. Not only does Captain Frothingham present much important and interesting matter, hitherto unpublished, but he fills the gap so the reader may follow the various military and political situations and events, which led from the desultory and isolated sinkings on merchant shipping in 1915 to the twice postponed decision for unrestricted U-boat warfare which brought the United States into the war.

These volumes, with the one or more to follow, should be found on the bookshelf of every army and navy officer as well as of everyone else who desires an accurate, readable, and always interesting Naval History of the War.—R. S. A.

Battles By Sea. By E. Keble Chatterton. The MacMillan Company. 1925. 5¾" x 8½". 271 pp. Illustrated. \$2.50.

In this very interesting book the author has selected for discussion twelve of the most interesting and, in some cases, most decisive sea battles of history. Three of these come from the age of galleys, six from the days of sailing vessels, and three from recent times. In each case the author discusses briefly the political causes of the war, the characteristics of the commanding officers on either side, the nature of the naval problems and of the fleets involved, and the battle itself. The evolution in naval construction is lightly traced, together with the consequent evolution in naval tactics or reversion to the tactics of earlier days. The immutability of strategical principles is demonstrated by pointing out that the strategy employed would have led to similar results in other ages.

Perhaps nothing seizes upon the imagination more strongly than a great sea battle, not because any of us delight in the horrors and the blood and the pain of war, but because of the intensely dramatic situation usually involved, the magnificent spectacle as a spectacle, and the suddenness of the end or the unconsidered, apparently unimportant, factor which brings about an unexpected end. The twelve battles so skillfully handled by the author, who is a close student of marine history, and the author of a number of books on ships and sea-men, illustrate twelve different situations, and as many different influencing factors. The battle of Salamis, 480 B. C., with more than eight hundred vessels involved, was lost by the larger fleet because of faulty naval strategy and bad maneuvering in the face of the enemy, and was won by the smaller fleet through choice of site and superior tactics. In the Battle of Actium, 31 B. C., we find a surprising and most important defeat, "not by valor nor by tactics nor by strategy, * * * but by the folly and bad influence of a spoiled woman." In the Battle of Lepanto, A. D. 1571, victory seems to have resulted from a skillful use of reserves, from valor, and from the death of the opposing commander-in-chief. In the Armada operations, 1588, we see the influence of greater determination and superior seamanship, gunnery, and tactics against greater numbers. The Battle of the Saints, 1782, was won by originality in tactics, with favorable wind as an important

factor. In the Battle of the glorious First of June, 1794, we find ship fighting ship, with materiel, seamanship, and morale contributing to the result. At the Battle of St. Vincent, 1797, a prompt attack against a superior fleet not quite prepared for action, disobedience of orders by Nelson, and a prompt withdrawal showed how victory could be achieved by prompt decision and prompt action. "Napoleon's strategic misunderstanding of a fleet's utility and office" resulted in the loss of the spectacular all-night Battle of the Nile, 1798. A determined commander and a reversion to the tactics of the Elizabethan period gave victory in the Battle of Trafalgar, 1805. The Battle of Lissa, 1866, the first battle between iron-clad squadrons, was a contest between a young admiral "resolved to fight and defeat the enemy" and an old man of a "dilly-dally, delaying, undecided, feeble temperament." The Battle of Tshushima was lost "by neglect of previous staff study and personal training" in a battle in which bad handling of the fleet and inferior gunnery played an important part. The final battle, that of the Falklands, 1914, represents the most recent sea-fighting and is used in preference to the Battle of Jutland because of the decisiveness of the former and the indecisiveness of the latter.

In these twelve battles the author takes us from oars to sails to engines, from the ram to the gun, from crude to scientific methods, but through it all we find the principles of strategy ever unchanging and the same factors—personality of leaders, morale and training and discipline of the men, battle tactics, relative inferiority or superiority of ships and ordnance, and accidental factors, as wind and weather—ever affecting the result.

War Weather Vignettes. By Alexander McAdie. The MacMillan Company, New York. 1925. 5¾"x 8¾". 62 pp. \$1.50.

Herein the author presents five short essays dealing with the influence of weather on the fortunes of war. All of the stories are taken from the World War and each one pertains to a specific battle, campaign, or incident. "War and Water" is devoted to the Syrian campaign; "Where Weather Won," to Jutland; the third essay, to the "Wind Gods at Gallipoli," "John Gilpin Aloft" relates the amusing story of the flight of the German dirigible, *The Balkan Terror*, to German East Africa and back again without alighting, all because the German authorities were fooled at the last minute by faked information furnished by a British radio operator. "Fate and a Forecast" tells the sad story of the drowning of Lord Kitchener in June, 1916. In this case an accurate weather forecast would have held up the mission a few hours, and the terrific sea storm would have been avoided.

Prof. McAdie writes in a charming style with frequent and happy touches of humor. In this field he can also speak with authority, since he is now Professor of Meteorology at Harvard University, was formerly with the U. S. Weather Bureau, and during the war served as an aerographic officer in the A. E. F.—C. S. H.

Callincus. By J. B. S. Haldane. Kegan Paul, Trench, Trubner & Co., Ltd., London. 1925. 4½"x 6½". 84 pp. \$1.00.

The author has named the book *Callincus* after the eight century inventor of "Greek Fire" as a symbol that Chemical Warfare is but an expansion upon the methods centuries old.

The book is a defense of the use of toxic smokes and gasses in warfare as being a more rapid, effective, and humane method of imposing one's will upon the enemy than by the use of explosives and bullets as the principal weapons.

The author describes gasses in use during the World War and their effects. Being a bio-chemist, he has the benefit of accurate scientific knowledge, and having served in the World War, he speaks from experience on the battle-field as well.
—G. H. B.

Jefferson and Hamilton. By Claude G. Bowers. Houghton Mifflin Co., Boston. 1925. 5½"x 8¾". 531 pp. \$5.00.

"The surrender at Yorktown ended one phase of the Revolution, but it was not complete until, after twelve years of nationhood, it was definitely determined that this should be not only a republic, but a democratic republic." Therein lies the crux of the issue between Jefferson and Hamilton. Therein lies the theme of this story.

In our childhood histories we read extracts from the stirring speeches of Patrick Henry, memorize portions of the Declaration of Independence, and form a lasting impression that our Revolutionary fathers were whole-hearted democrats in unanimity. Far from the truth. Did they believe that all men were born free and equal? A Virginia aristocrat or a Massachusetts aristocrat was equal to, and had equal rights with, an English aristocrat, but as to the city laborer, the small farmer, or the frontiersman, he was inferior in birth, life, and death. Witness the manner in which a few tidewater aristocrats denied the franchise to their laboring classes and controlled the states by refusing a fair representation to the western sections. Property rights interested them much; human rights, little.

When Hamilton entered Washington's cabinet, he became the political leader of the aristocratic class. This position he attained through sheer ability and industry. He was not a democrat. He was not a republican. He was a monarchist. He believed in governmental control by responsible leaders, and these leaders were men interested in property rights. No faith had he in the rank and file. Arrayed in his support were a host of leaders "perhaps, the most brilliant, and certainly the most attractive in American history." He was in the saddle and he rode hard. While he rode Jefferson watched.

Jefferson was a student of nature. Particularly he was a student of human nature. Undoubtedly he realized the inherent weakness in democratic government; still he had faith in its ultimate strength. He understood the spirit of his time. He was a philosopher. To quote from the author: "It is easier to understand the Hamiltonian distrust of democracy than to comprehend the faith of Jefferson—a faith of tremendous significance in history. Quite as remarkable as his faith was the ability of Jefferson to mobilize, organize, and discipline the great individualistic mass of the towns, the remote farms along the Savannah, the almost unbroken wilds of the Western wilderness. * * * He won because he was a host within himself, capable of coping single-handed against the combined geniuses of the opposition in the field of practical politics."

Early in Washington's administration the struggle between these two giants began, and continued until Jefferson was inaugurated President. In a fascinating manner Bowers leads us through this dramatic period. He does not merely record, he portrays history. His work in interpreting the spirit of the times is truly remarkable in its vividness. He neglects neither the gay parties of the capital "society," nor the nightly gatherings of the workingmen in their ale houses. The author has attempted to present the story in a spirit of fairness. However, he leans slightly to the Jeffersonian viewpoint. At any rate, the Hamiltonian side of the question could be presented more favorably. From any viewpoint the book stands out as the most charming and most vivid history of this period yet presented to the public.—C. S. H.

The Economic Development of the British Overseas Empire. By L. C. A. Knowles. Albert & Charles Boni, New York. 1925. 6"x 8¾". xv + 555 pp. \$4.00.

The government of colonies is a subject which, for obvious reasons, must be of interest to every military student. And although we are, usually, more immediately

concerned with matters of police and security, nevertheless there have been occasions in the past, and there may be occasions in the future, when we, as military governors, temporarily exercise the broader power, ordinarily reserved for statesmen and politicians, of directing and developing the purely commercial and economic life of a community. With this possibility in view, it is important to acquaint ourselves with what has been done by our predecessors, to learn the causes of their successes, the reasons for their failures, and the tools which they found the best suited, thus fortifying our own meagre knowledge, and avoiding unprofitable experiments, arriving expeditiously at a scheme which we reasonably may expect to work.

This book by Dr. Knowles is not only instructive along the lines just mentioned but also is very agreeable reading for the general student. It treats quite comprehensively of the gradual rise of Britain's colonial empire, of her charges in colonial policy, and especially of the causes underlying the economic development of her far-flung possessions. The author shows clearly the manifold disappointments and set-backs which must be the portion of any agency which seeks the uplift or commercial benefit of a backward race. Among these are the notorious laziness of the average native of the tropics, the prevalence of disease, insect pests, lack of roads or other means of transportation.

Dr. Knowles discusses at length numerous agencies employed in the furtherance of British colonization, but the one agency which he considers of primary importance is transportation—and more particularly the railroad. Indeed, he is careful, throughout his book, to show the primary role played by the railroad. Even before the trains are running it is a powerful agent for good because, during its construction, it gives employment which is practically non-seasonal—as distinguished from such seasonal occupations as farming and the like. After completion, the railroad knits the country together and tends to obscure sectional boundaries; peoples can mingle and trade more easily, and, above all, an easy entrance is made for British goods. The far-reaching effect of the railroad on many phases of the life of the colony, its use in preventing famines, in preserving order, in education, in employment, in raising the standard of living,—all these are rather fully treated, and in a readable style.

Especially interesting to Americans is the parallel we may draw between England's position with respect to India and our own problem in the Philippines. True, the author presents no solution to our problem, but at least he brings out several points of importance and likeness which probably are new to the average newspaper reader.

At the beginning of each of the chapters of the book the author presents a short topical outline, thus assisting the reader to follow the argument where otherwise he might not appreciate the sequence and the arrangement employed.

The book is decidedly worth while.—P. D. B.

Taschenbuch der Luftflotten (Pocketbook of the Airfleets). By Werner von Langsdorff, Dr. Ing. J. F. Lehmanns Verlag, Munich, Germany. 1925. 4½"x 6½". 530 pp. Illustrated. 12 marks.

The fourth edition of this little pocketbook gives in concise tabular form the specifications and characteristics of every type of aircraft and aircraft motor in use in the world together with the names and addresses of all recognized manufacturers and notes on the development and organization of the airforces, both civil and military, of the various nations.

Although the book is printed in German the 793 halftones, scale drawings and silhouettes with which it is illustrated make it of value even to one unfamiliar with the language.—D. L. D.

A Trooper with Custer. By E. A. Brinistool. The Hunter-Trader-Trapper Company, Columbus. 1925. 5¼"x 7¼". 214 pages. Illustrated.

This brief volume consists principally of the personal experiences of the officers and men of the Seventh Cavalry who survived that greatest of all Indian battles, the fight of The Little Big Horn, better known as the Custer Massacre.

The author obtained his information directly from the participants in the unfortunate Custer campaign, and the trooper whose experience is featured is William C. Slaper, of Troop M, Reno's command, now living in Los Angeles, who tells a convincing story which makes uncommonly good reading.

The purpose of the book seems to be to prove that Major Reno acted with courage, judgment and military skill in getting the survivors of his command out of their desperate situation, and Mr. Brinistool quotes freely from the official testimony given at the Court of Inquiry called at Major Reno's request in 1879.

A number of original photographs are used to illustrate the volume and the result is an interesting book filled with reliable information, of especial interest to students of the Indian campaigns connected with the settlement of our great West.—E. L. B.

Races, Nations and Classes. By Herbert Adolphus Miller. J. B. Lippincott. 1924. 5"x 7½". 196 pp. \$2.00.

A psychological and sociological study of group conflicts and some of the causes for the crystallization within the modern world of definitely organized social units.

The writer presents his subject in a manner which will induce the reader to draw his own conclusions and does not attempt to offer predictions as to the next step in the apparently unceasing animosity between races, nations, and classes.

Of special interest to the soldier strategist are his remarks on Ireland, India, Poland, the Balkan States, and Korea. In each case the material presented tends to show that the intense animosities between these peoples and their neighbors were largely due to suppression and that a group consciousness was often developed which otherwise have remained dormant or have totally disappeared.

The maintenance of nationalistic aspirations and the preservation of a definitely recognizable group by means of the unifying action of language, religion or group history at variance with that of the governing nation is presented with numbers of illustrative examples.

Because of the large amount of material presented and its highly condensed form, the book is not recommended for those desiring light reading, but it will be found well worth while to those desiring an additional means for the interpretation of the apparently endless struggle between "Races, Nations, and Classes.—G. H. B.

Evolution for John Doe. By Henshaw Ward. The Bobbs-Merrill Company. 1925. 5¾"x 8½". 354 pp. \$3.50.

"Keep your eye on the chromosomes" says Mr. Ward, writing as one layman to another, in this very vivid and interesting discussion of the theory of organic evolution. These infinitesimal loops of matter or life which form the nuclei of each cell of every plant and animal contain in themselves, apparently, every specification for the duplication of the parent cell. The chromosomes of a cell of clover pollen contain the specifications for and are able to reproduce another clover plant inheriting all the peculiarities of the first. And no living organism exists except it had a parent organism or cell from which it sprang. Mr. Ward makes us see as though he

turned back the pages of the world's earliest history, this unbroken life stream in which no gap can ever have occurred.

But the whole theory of evolution is based on the fact that "the chromosomes never reproduce exactly." No two roses are exactly alike. No two puppies in a litter are exactly alike. Using this fact, Mr. Burbank is able to give the world wonderfully new and useful plants. Using this fact, stock raisers produced the *polled hereford* cattle and the *ancon* sheep. Nature, using this fact through the millions of years of which life on earth has left its record, and by the process of natural selection has produced apparently from one original form of life the "one hundred thousand well defined species of beetles plus a greater number of sub-species or varieties" which the naturalist has counted and classified; sixteen thousand species of mosses; eight thousand worms, thirteen thousand birds, and so on until the mind is staggered by the numbers. Nearly all of these many thousands of kinds of plants and animals have sub-species shading off into the adjacent species.

Evolution has sought to bring order out of this chaotic mass of figures and to determine a reasonable theory to account for the seemingly meaningless variations of the forms of life. Mr. Ward tells us that variation in inherited characteristics plus natural selection will account for every form of life and he piles up evidence upon evidence; evidence from the rocks; evidence from the structure of animals; evidence from embryos; evidence from the experimental farms, gardens, and laboratories, all of which supports the theory which he is expounding.

At the end, the reader lays the book down with a comprehensive, if elementary grasp of the scope of scientific research. The end announced in the opening chapters has been attained. Nothing has been proved, because evolution is not subject to mathematical demonstration, nothing has been argued, the origin of life has not been mentioned; a mere outline of what scholars know and what they believe has been presented in simple language and manner.—B. B. W.

Let us recollect that peace or war will not always be left to our own option; that, however moderate or unambitious we may be, we cannot count on moderation, we cannot hope to extinguish the ambitions of others.—*Alexander Hamilton.*

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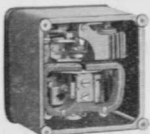
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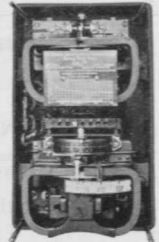
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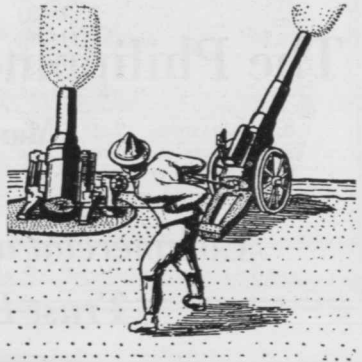
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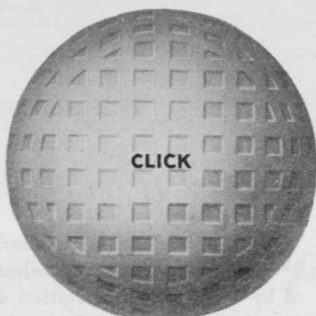
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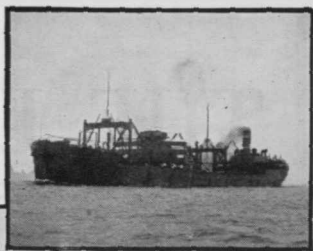
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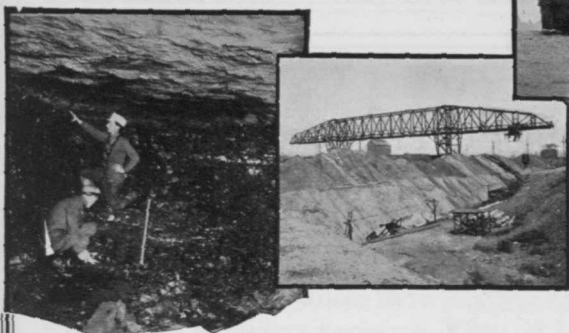
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